

JOHNSTON ATOLL
NATIONAL WILDLIFE REFUGE

Central Pacific Ocean

ANNUAL NARRATIVE REPORT
Calendar Year 1992

U.S. Department of the Interior
Fish and Wildlife Service
National Wildlife Refuge System

REVIEW AND APPROVALS

JOHNSTON ATOLL NATIONAL WILDLIFE REFUGE

Johnston Atoll, Central Pacific Ocean

ANNUAL NARRATIVE REPORT

Calendar Year 1992

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Seabird's eye view of Johnston Island and Sand Island
(in top left corner) (R. Di Rosa)



Welcoming signs at the Johnston Atoll airport.
(R. Di Rosa)

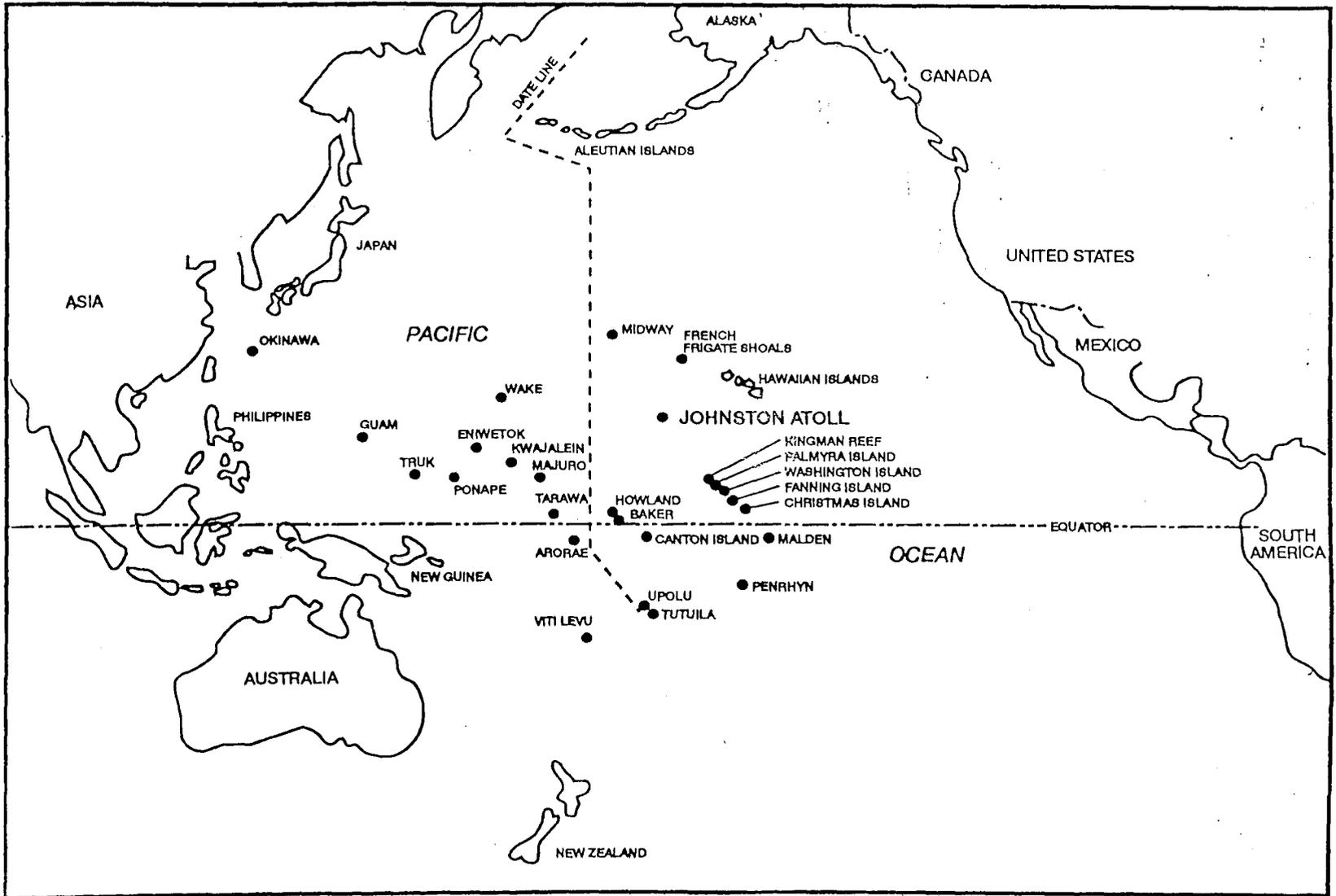


Figure 2. Regional Map

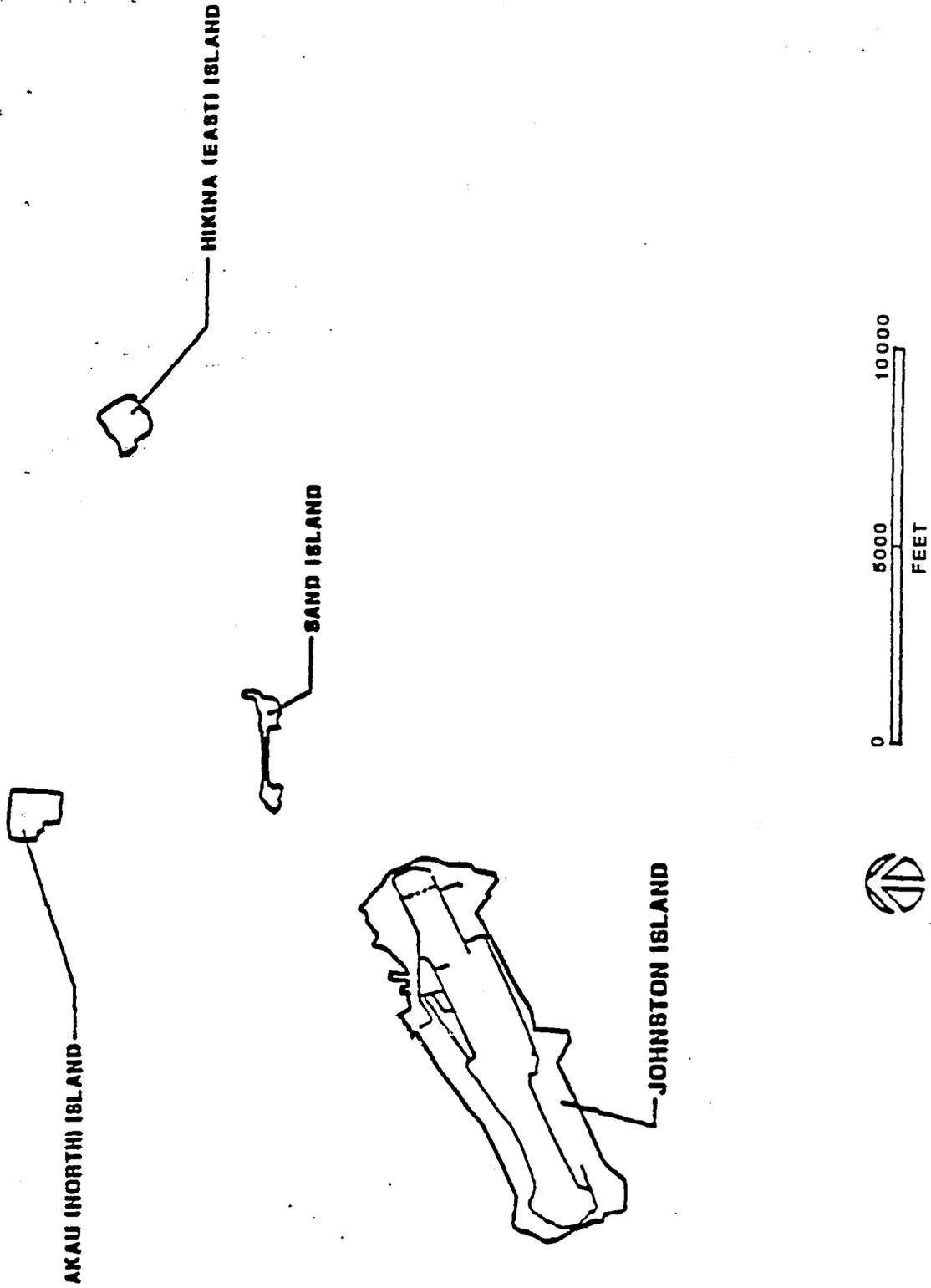


Figure 3. Island Map

INTRODUCTION

Johnston Atoll National Wildlife Refuge is located in the Central Pacific Ocean, 717 nautical miles west southwest of Honolulu, Hawaii and 460 nautical miles south of French Frigate Shoals. Because of the great distances to other islands, Johnston Atoll is one of the most remote atolls in the world. It is the nearest land to over 820,000 square miles of ocean. The Atoll consists of approximately 32,000 acres of coral reef shallows containing four small islands totaling 691 acres. Two of the islands, North and East, were man-made through extensive dredging in the early 1960's. Beginning in the late 1930's, Johnston and Sand Islands were modified and enlarged by dredging and filling, which would continue off and on through the years until the 1960's. Johnston Island is presently inhabited by approximately 1,300 military and civilian contractor personnel while Sand Island was the duty station for 10 Coast Guard personnel who maintained a LORAN C station there until its decommission in July of this year.

Operational control of Johnston Atoll (JA) as a strategic military installation is maintained by the Defense Nuclear Agency (DNA), Department of Defense. The DNA assumed management responsibilities through a permit issued in 1973 by the Air Force for use and occupancy of JA and its facilities. The Air Force had received responsibility for the Atoll from the Navy in 1949. A Memorandum of Agreement between the U.S. Department of Defense (DOD) and the U.S. Department of the Interior (DOI) was signed in 1976 which provided for co-management of the Atoll. The DOI, represented by the FWS, was given primary responsibility and jurisdiction for the protection and preservation of the Atoll's natural resources. The DOD, represented by the DNA, was given responsibility and jurisdiction over the Atoll's human residents and visitors.

The Department of Energy (DOE) maintains a full time representative on the atoll who acts as the Deputy Base Commander but has oversight authority outside of that position. DOE's interest goes back to the 1950's and 1960's when it ran the nuclear atmospheric testing program. It currently is responsible for maintaining the Atoll's Safe-C status (the ability to return to atmospheric testing) and for maintenance and oversight of Atoll contracts. The DOE is in essence a watchdog over DNA to ensure that DNA does its job of overseeing the island operations contractor, Raytheon Services Nevada (RSN) and other island tenant contractors. All money and contracts go through or come from DOE and are dispersed accordingly. As you might imagine, such an oversight responsibility is not without its local and external conflicts.

The DOE has no authority over or oversight function of FWS activities. On the contrary, the Refuge Manager provides information to DOE and/or DNA as the case may be if contractors are not responsive to the FWS.

The U.S. Army uses Johnston Atoll as a storage facility for 6.7% of the nation's stockpile of obsolete chemical weapons. In addition, the Army completed construction of the Johnston Atoll Chemical Agent Demilitarization System (JACADS) in July of 1990 for the destruction of these munitions. It is a hi-tech, computerized, prototype plant utilizing robotics to disassemble the munitions and prepare the components for high temperature incineration. This facility has attracted national and international news coverage and has been responsible for a tripling of the Atoll's population. It has been controversial from day one for a variety of reasons, not the least of which is its potential effect on the environment from stack emissions. Many South Pacific nations, the state of Hawaii and certain environmental groups have been strongly opposed to the operation. The movement of the U.S. stockpile of chemical munitions in West Germany to Johnston Atoll in late 1990 added more fuel to the fire, so to speak. Other major contaminant issues include at least four acres of land contaminated with Herbicide Orange which contain soils with over 450 ppb of dioxin as well as related lagoon contamination, 26 acres contaminated with transuranium elements as a result of three failed nuclear tests in the 1960's and tens of thousands of gallons of subsurface petroleum contamination.

The Refuge was established in 1926 by Executive Order number 4467 of President Calvin Coolidge "as a refuge and breeding ground for native birds." It retained that status even through the major activities of the war years and the era of nuclear atmospheric testing in the 1950's and 1960's. In 1940 the name of the Atoll was changed from Johnston Island Reservation to Johnston Atoll National Wildlife Refuge. At present, the Refuge is managed as nesting and roosting habitat for 14 species of seabirds, wintering habitat for 5 species of shorebirds, and as habitat for a diverse assemblage of marine animals, including the threatened green sea turtle. One Refuge Manager and one Biologist were stationed on Johnston Atoll during the period of this report. Johnston Atoll National Wildlife Refuge has been identified by the Service as a high priority area for corrective action relating to contaminant issues.

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A. HIGHLIGHTS

The role of the Refuge on Johnston Island continued to grow in the past year. The funding for the refuge manager position and O & M was again increased by the Army. (section E. 5.)

Contaminant issues continued to be a prominent part of the Refuge Manager's job as many issues continued to escalate. (section D. 4.)

The Coast Guard LORAN Station was decommissioned and the 640 ft. high tower was removed. (section F. 6.)

JACADS environmental and operations issues continued to attract large numbers of dignitaries to JA. The Refuge Manager gave numerous programs and briefings to high ranking military and civilian personnel on the FWS role at JA and environmental issues and conflicts relating to JACADS/military/FWS interests. (section H. 1.)

A major article in a major magazine was published about Johnston Atoll, chemical demilitarization and the Refuge. (section H. 7.)

B. CLIMATIC CONDITIONS

Johnston Atoll (JA) has a mild tropical oceanic climate dominated by cooling northeasterly trade winds. Weather observations are taken at the Johnston Island NOAA Weather Station. The yearly mean temperature was 80.0° F, which was a departure of 1.1° from the average long term mean. The rainfall for the year was 43.23 inches, which was 16.71 inches above normal. The most significant weather event was the 8.59 inches of rainfall in December, most of which fell during an anomalous storm event.



The unusual December storm with winds to 70 mph uprooted many attractive and nice black noddy and white tern nesting trees. Humans also lost about \$250,000 worth of their habitat. (R. Di Rosa)

Table 1. Monthly high and low temperatures and rainfall recorded at Johnston Island during 1992.

<u>Month</u>	<u>Temperature (°F)</u>		<u>Rainfall</u>
	<u>High</u>	<u>Low</u>	
January	86	70	1.31
February	87	68	0.36
March	85	71	1.56
April	86	71	0.58
May	89	71	0.85
June	90	74	0.73
July	90	72	3.27
August	91	75	3.05
September	92	74	5.05
October	90	71	10.41
November	81	73	7.47
December	80	71	8.59

D. PLANNING

1. Master Plan

There is no master plan for Johnston Atoll NWR.

2. Management Plan

There is no management plan for the refuge. However, base and refuge regulations govern public actions so that impacts to the resources are minimized. However, there are no data or current studies that can be used to adequately assess impacts on the marine ecosystem. Adequate data are available for seabirds. Human impacts appear to be negligible on them except for the Coast Guard LORAN tower that has now been removed. A Fisheries Management Plan exists but it is not truly adequate given the increased pressure being placed on lagoon resources and the lack of data.

The Refuge Manager and Biologist are involved regularly with monitoring the day-to-day operations of the base maintenance and construction contractors and advising them on how to limit their impacts on wildlife habitat. They were also

asked to participate in the planning of numerous construction and military activities through the year.



Typical human and wildlife habitat of Johnston Island.
(D. Forsell)

No construction or digging except for emergencies can take place without the authorization of FWS personnel. We must review and sign all internal work orders for such activities to prevent destruction of seabird nest sites and ensure that all considerations have been given to the activities where there are conflicts. The military is required to minimize impacts to wildlife and habitat and mitigate where it must disturb or destroy habitat. Some examples where we get involved are given below. They represent only a small portion of the many activities that involved FWS input to prevent greater conflicts in the future.

The Army conducted two major CAIRA (Contaminants Accident/Incident Response Action) exercises and several smaller maneuvers or exercises. Most of the exercises have to do with keeping the Army personnel (military police and chemical weapons and materials specialists) in a high state of readiness for emergencies. The exercises may involve island personnel only or involve midnight transports bringing large numbers of special operations troops in to simulate a major event. Before each exercise the Manager or Biologist examined the proposed site for nesting seabirds and flag nest sites or recommend changes to plans or site

locations to prevent conflicts. All military personnel were well briefed before each operation to ensure adherence to agreed on procedures. No conflicts resulted from any of the activities which is a credit to the Army's willingness to cooperate and support FWS objectives.

The various contractors were advised and/or monitored on numerous activities including storage of hazardous waste and materials, allocation of storage areas, avoiding destruction of nesting habitat, disposal of construction debris and trash and use of chemicals. The Manager and Biologist make regular checks around the island for improperly stored or deposited debris or activities that are producing or might produce contamination. Admittedly, this is not their job and the contractors should be policing themselves, but experience has been a better teacher than expectations. Efforts are being made to change such attitudes and increase the responsibilities of the contractors. There has been some improvement over last year but much more is needed.

The Refuge Manager is always included in various committees to provide information or a professional opinion regarding island environmental activities such as recycling, composting of sewage sludge and its disposal, reduction of nontoxic waste and its disposal on the island, etc. This is in large part a result of his being considered an island community leader who possesses authority over many activities and; therefore, resides on the City Council to review many island activities. However, the Manager keeps his nose out of safety, recreational activities, clubs, operations and related decisions that have no bearing or impact on the natural resources of the atoll or the FWS mission. He has been placing more pressure on the military and contractors to be doing what they are supposed to be doing environmentally and not to expect the FWS to be responsible for solving their problems.

4. Compliance with Environmental Mandates

Contaminants

Contamination, either present, past, or future, is a part of life at JA. Being issued and fitted with your very own gas mask adds to the significance of anything new residents or visitors may have heard about JA. Even though JA is the most contaminated piece of soil the FWS manages and despite the storage and destruction of chemical munitions, JA is a far cry from a toxic wasteland as it is often depicted in the media.

Contamination at JA falls into three categories: Past - contamination that we have yet to discover but know the

probability is high of doing so, such as old underground storage tanks and lines or existing subsurface petroleum, the limits of which haven't been determined; present - known contamination or contaminated sites such as the dioxin contaminated, old Agent Orange storage site, Plutonium contamination, subsurface petroleum, heavy metals, etc.; future - potential toxic emissions from the JACADS stacks or a chemical accident involving the munitions or a fuel spill from the large storage tanks or a fuel tanker. To complicate the issue, the military contractors either barely have or don't have the necessary skills or equipment to handle certain types of incidents such as a large oil spill. It is somewhat ironic that in the midst of all this contamination, hazardous and many types of nonhazardous waste cannot be disposed of at JA. It must be deactivated if possible or shipped off island to, you guessed it, an approved disposal site in the continental U.S. Temporary or long term storage of some waste (dioxin contaminated soil and items) is permitted under existing RCRA permits.

The Manager at JA is extensively involved in contaminants issues by the very nature of his position as somewhat of a watchdog and the fact that there has not been, until recently, a contaminants specialist at JA or in Honolulu to represent the Service. The new contaminants specialist based in Honolulu is overwhelmed with issues. Therefore, the Manager has become a contaminants specialist by default. His knowledge of and involvement in contaminants issues probably far exceeds that of any refuge manager in the continental U.S. (CONUS). Also, the previous biologist who had the functions of a manager was the only "environmentalist" on the island for a long while and had to assume some responsibilities that would not have been acceptable for a manager at a more traditional refuge.

This is a somewhat precarious position since the Service has provided little to no guidance in this area and it has been left up to the Manager to determine liability and, in some cases, accept responsibility (and liability) for others' work by doing their jobs. The current Manager was greatly surprised at what the previous biologist/manager was involved in, the potential liabilities existing from some activities and the lack of interest and/or ignorance of the Honolulu and Regional Offices about what was and is occurring at JA.

In late 1990 the Manager began the process of defining liability and responsibility for certain activities and turning those activities over to the responsible parties. In one case he had to actually begin training the responsible party to do the job. It is a long story about the efforts involved and time spent in doing this, and it

isn't over yet. There has been considerable change over last year, and the Manager is not regarded as the adversary he once was since a lot of support has been given to his positions. The Army has become much more responsive and cooperative. However, the DNA has continued with a somewhat negative and less than appropriately responsive attitude.

For a review providing greater depth and history of the following items refer to the 1991 Annual Narrative. Without the necessary background knowledge of many of these areas, the reader can easily jump to erroneous conclusions or improperly question the decisions of those with more experience or knowledge. If the reader has major questions about any activities or their seeming incongruities and decisions that were made then read past documents or call the Refuge Manager.

NPDES (NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM)

Outfall 008

Outfall 008 is the outfall for non-contact cooling water for the Johnston Atoll Chemical Agent Demilitarization System (JACADS) facility. It flows directly into the lagoon and has the potential to affect green sea turtles and/or their habitat and lagoon sea life in the area. The NPDES permit specifies the parameters within which the discharged water can vary from the ambient temperatures. In-the-water data collection points continuously monitor the ambient temperatures in several areas.



Aerial view of the JACADS peninsula and the JACADS plant. Extensive green sea turtle foraging habitat exists all around the peninsula. (R. Di Rosa)

The controversy over who was responsible for data retrieval and reduction was resolved in the Service's favor. PMCD (Army) accepted full responsibility and the Refuge Manager trained the responsible personnel to do the work, and he monitored their activities. He also provided backup during problems of sensor extraction (SCUBA diving is required) and data reduction. By the end of the year the process was going well except for the new personnel occasionally losing data.

The Manager previously identified that PMCD was in violation of the NPDES permit on several counts and that the permit itself was inadequate to protect FWS interests. PMCD began the process of bringing itself into compliance with the existing permit and writing a request to EPA for a permit modification to correct the original permit inadequacies. The manager assisted by reviewing and commenting on all documents and providing technical assistance. He also monitored the progress. All issues are not yet resolved.

Storm Water Discharge Outfalls

Johnston Island has over 70 storm water outfalls, some of which flow from areas classified as industrial and roads and airfield tarmac. New Environmental Protection Agency (EPA)

regulations require that all outfalls (not just from industrial areas) be classified and evaluated as to their potential for discharging contaminants. To insure that FWS interests were protected the Manager attended several meetings and reviewed documents related to compliance with the new regulations. The responsible party for each outfall was identified and each outfall will be tested on a regular basis during significant rainfall events.

Sewage Discharges

Johnston Atoll has a sewage treatment plant that treats the island's sewage and separates and retains the sludge. Raw sewage was discharged for decades prior to the completion of the plant in 1991. The uncontrolled discharges significantly impacted the sea life in the area and resulted in the killing of large amounts of coral and the growth of large algae communities. However, the area is open to the sea and receives strong flushing action, and human recreational areas are located on the other side of the island so there has been no health risks. The plant is inadequate for the number of personnel on the island and discharges improperly treated sewage on a regular basis, especially during heavy rains and malfunctions. Refuge personnel monitor the operations and sea life in the area to detect any serious problems or long term changes. The DNA is exploring corrective actions but any viable solutions will be costly.

RCRA (RESOURCE CONSERVATION AND RECOVERY ACT)

The extent of contamination or contaminated sites, better known as Solid Waste Management Units (SWMU), that fall under this act are about 18. The number will likely increase. A process of consolidating information about the sites and identifying assessment needs and requirements began this year. It is expected that all identified sites are subject to investigation and possible corrective action measures as required by the EPA. From an environmental contaminants standpoint and potential to affect the refuge resources the two most important sites are the 4-5 acre former Herbicide Orange storage area and the subsurface petroleum contamination. The heavy metal contaminated ash pile from the burn pit is a not too distant third.

Agencies at JA have either or both class A and B permits. The DNA is storing dioxin contaminated earth and materials from the partial cleanup of the old Agent Orange storage area. It cannot be shipped off island since there is no EPA approved process for the disposal of waste contaminated with dioxin, except for on site incineration. Regulatory requirements and costs make this prohibitive, which is just

as well since there is an additional four acres, perhaps to a depth of 30 inches or more, of contaminated soil that must be remediated. The Army is storing and destroying hazardous waste (obsolete chemical munitions) at JA.

The biggest concern from the environmental perspective, especially from Greenpeace, has been the potential impact from possible pollutants being discharged from the stacks of JACADS. The chemicals in question are the organochlorines, dioxins and furans, which could be produced from the burning of mustard gas. The military assures us that virtually nothing but steam escapes from the stacks and JACADS complies with all EPA regulatory requirements, especially TOSCA (Toxic Substances Control Act), and regulators have come and gone at a steady stream since commencement of operations. Nonetheless, Dr. Lobel from WHOI was contracted to study the marine resources for potential effects and gather related baseline data on fishes and, if possible, the microlayer. An important part of his work involves trying to determine what contaminants, mainly furans and dioxins, were present in the marine environment prior to JACADS. This would prevent JACADS from being implicated where it is not at fault. The most obvious problem is the dioxin contamination of sediments and some reef organisms in areas adjacent to the Agent Orange site where contamination continues to seep into the lagoon from the contaminated site. Refuge staff assisted Dr. Lobel with his fish and sediment collections and preparation when necessary. The Manager reviews and comments on all documents related to RCRA and other contaminants issues for the Service.

There are both RCRA Part A and Part B Permits issued to the Defense Nuclear Agency and the Army at Johnston Atoll. The permits involve the storage and destruction of hazardous waste (Army-chemical agents) and the storage of hazardous waste and releases of hazardous waste and the constituents of hazardous waste from several of the 18 identified SWMU's (DNA). SWMUs are sites of contamination that have been identified as needing remediation. The Refuge Manager is in some way involved in almost all aspects of RCRA activities since the waste or remediation activities are affecting or have the potential to affect, in some cases severely so, the refuge's natural resources. The Manager reviewed and commented on several major documents related to RCRA activities this year. The most noteworthy being the extensive, two volume RCRA Facility Investigation Work plan produced by Raytheon Corporation, a major island contractor responsible for support services. The timely and very much needed document covered all SWMUs and their history, identification, status, and current and proposed remediation activities. Time and space do not permit an in-depth coverage for the reader of all the nuances of JA

contamination related to these SWMUs.

Solid Waste Burn Pit

The DNA and the Base Contractor became much more serious this year about considering options for disposing of the contaminated ash. Several options were developed and offered to the Refuge Manager for consideration but were eventually rejected, at least for the time being. They ranged from extracting the lead from the ash on site, to encasing it in a polymer like substance or concrete and placing it on the artificial reef if tests proved the lead would not leach. However, dumping on the artificial reef is itself a very costly alternative. Examination of the issue is continuing. The only action taken during the year was to stabilize the ash. The contractor sprayed sealant over the ash pile to prevent the wind from blowing any more of the contaminated ash into the lagoon.



Over 10,000 cubic yards of lead contaminated ash at the waste burn pit awaits disposal. An environmentally and economically acceptable method has yet to be developed. (R. Di Rosa)

It has been pointed out to the Base contractor that the new segregated (clean) ash pile may not be as pure as has been indicated in contaminants documents. The area is not fenced to prevent illegal dumping and the types of materials placed in the large dumpsters throughout the island are not known

or segregated. A variety of chemicals and compounds have been discovered in the past. The contractor has indicated there are plans to correct this. It must be done when the new incinerator is built anyway (See Clean Air Act).

DERA (DEFENSE ENVIRONMENTAL RESTORATION ACT)

This is the Department of Defense's equivalent of CERCLA (Comprehensive Environmental Response, Compensation and Liability Act, also known as the Superfund) which addresses cleanup of contamination on DOD lands. Contaminants issues that are being funded by this are the old Herbicide Orange (Agent Orange) Storage Site and the subsurface petroleum contamination. The Air Force is the responsible party for both of the SWMUs. Money has been appropriated by the Air Force to begin remediation of the sites. Money had been appropriated in the 1980's to determine if dioxin contamination from the Herbicide Orange site had reached the lagoon and bioaccumulated in organisms.

Former Herbicide Orange Storage Site (Dioxin Contamination)

By far the most controversial issue is the dioxin contaminated old Agent Orange storage site comprising about four or so acres. A short history of the site is in order. Approximately 1.37 million gallons of Agent Orange were removed from Vietnam at the end of the war and stored at JA. It was not properly stored or monitored by today's standards, and many of the barrels leaked or were mishandled and product spilled. The Agent was later destroyed at sea in the Dutch incinerator ship, Vulcanus. The Agent contained the dioxin as a by-product of improper manufacturing or control techniques and should not have been in the Agent in the first place.

Studies of soil within the site detected contamination as high as 449 parts per billion (ppb) and perhaps as deep as 30 inches. In 1987 the previous biologist/manager developed a plan for monitoring the infiltration of dioxin into the lagoon. Subsequently the Air Force accepted and funded it. The biologist began sample collections of organisms in 1989 for lab analysis. A number of organisms were found to contain detectable levels of contamination.

The new Manager and Biologist continued the sampling procedure soon after their arrival in 1990. Even though the Manager continued the sampling and testing he felt very uncomfortable with the project because there was no good written methodology or protocol for it; work was being done strictly by verbal instruction that the departing biologist had given the present Manager; past organisms had not been properly labelled and there did not seem to be good written

justifications of why various organisms had been selected for sampling; and apparently the project had never been reviewed by appropriate authorities or specialists such as ichthyologists, contaminants specialists and/or toxicologists, or higher level FWS personnel. The Manager perceived a certain degree of liability for himself since he was not a specialist in this area and past documentation was so poorly handled. The Service was at fault for having shown such a lack of interest and poor oversight, and little interest was paid to the Manager's complaints (there was no contaminants personnel in the Hawaii FWS offices).

Therefore, the Manager enlisted the aid of Dr. Lobel, an ichthyologist with a background in marine contamination. He agreed to help at no cost and he and the Manager developed a rationale for sampling certain marine organisms based on their life histories. However, the Air Force funding to continue the sampling and testing was running out and only allowed for the testing of one more batch of collected samples. WHOI possessed the resources to sample specimens for dioxin and furans and agreed to do additional samples analysis during the year and seek funding from the Army as this had special relevance to JACADS.

Being able to qualify, and quantify if possible, the limits of dioxin contamination in the lagoon is more important to the Army than it might first appear. The biggest controversy over JACADS, outside of a possible chemical release, is potential contamination from the stack emissions that may contain dioxins and furans. Thus, it is to their advantage to develop baseline data (even belated data) to document any existing contamination from these toxins. By the end of the year the Army had agreed to fund further studies designed by Dr. Lobel to do just that. The Manager was removed from the liability equation; however, he would continue to provide support to Dr. Lobel for sample collections and review of documents.

Assistance was provided to Woods Hole Oceanographic Institution with the collection of fish and sediment samples for dioxin and heavy metal analysis. Numerous meetings with the Air Force (responsible party), DNA, WHOI, EPA and others were attended by the Manager and the new Honolulu FWS contaminants specialist. The discussions covered remediation options for the site, limits and levels of contamination of lagoon resources, risks to humans and effects on refuge resources. The effort was increased to determine the risk, if any, to human health from the consumption of locally caught fish and, thereby, attempt to limit agency liability by taking appropriate actions. Numerous articles, papers and documents were reviewed and commented on by the Manager. The potential risk to human

health through consumption of lagoon fish makes this a potentially complicated and volatile issue. The Manager works closely with the military commanders to ensure good communications and information dissemination to limit potential liability.



Manager Di Rosa spearing fish for dioxin analysis off the contaminated old Herbicide Orange storage site.
(P. Lobel)

No resolution for remediation of the site was reached by year end. The difficulty arises from the fact that it would be exceedingly expensive to haul four or five acres of soil thirty inches deep to the U.S. for disposal. This assumes it can be done, which it can't since there is no EPA approved disposal sites for dioxin. On site incineration is the only approved method of disposal. The cost of building an EPA approved incinerator at JA makes this a very unlikely possibility. The politics of the situation would be a major stumbling block as well. Therefore, the only real options are some form of storage of all the contaminated soil or sealed containment (e.g. specialized concrete cap) of the entire site. The contamination would then wait on future technology to develop better methods of destruction of the hazardous waste or remediation of the site. These options are being explored as I write. No, JACADS can not be used to incinerate the soil for technical, environmental and political reasons. Nice thought though.

Subsurface Petroleum Contamination

In 1991 the Base contractor, RSN, began a drilling project to determine the quantity of subsurface petroleum contamination. The contamination resulted from numerous underground storage tank and pipeline leaks and surface spills over about a 45 year period. By the end of this year the total estimate for all sites was approximately 250,000 gallons and climbing. It will probably be much larger by the time the evaluation is complete next year. In the interim, remediation actions have begun. The first of many small wells was drilled to begin continuous pumping of the fuel oil in several areas. Pump installation will continue into 1993. Each skimmer pump does not pump out large quantities, but over a period of time and with numerous wells it may be possible to achieve a reasonable amount of oil extraction to at least aid in bioremediation attempts. The first of these wells was placed around the Tank 49 area to help stem the flow of leaking oil into the lagoon, but the impact was negligible.

In addition, bioremediation was being explored as another cost effective option to dealing with the problem. Analysis has shown that oil eating "bugs" are present in the coral "soil" and have been working on the fuel. Plans are to inject oxygen and maybe additional bugs to speed up the process. This process is still in a test phase and the project will be considered such, but it has promise.



Drilling to determine the extent and quantity of subsurface petroleum contamination throughout Johnston Island continued in 1992. (R. Di Rosa)

PLUTONIUM CONTAMINATION AND SITE REMEDIATION

The contamination is the result of three rocket explosions (one on the launch pad and two in the atmosphere) during the atmospheric nuclear test launches of the 1950's and 1960's at JA. The detonations were not nuclear. Thus, the contamination that resulted was the scattering of radioactive raw plutonium about the islands and launch site. The contamination (other than that which landed in the lagoon) was identified and removed at a later date to be stored in a 26 acre site that contained the launch pad. Contaminated sediment adjacent to the site (much of it had been bulldozed into the lagoon immediately after the launch pad explosion) was retrieved by dredging and also stored on the site. The flesh of lagoon fishes was sampled in the early 1980's to detect any potential radiological contamination. Nothing greater than what could be expected from background radiation was discovered. The risks to humans entering the site are minimal and depending on the nature of the work, only monitoring in and out is all that is required. The plutonium is a beta particle emitter. Generally, no protective clothing is required, depending on the nature of the work of course. We coordinate closely with the project operators because of the large number of Red-tailed tropicbird nests occurring in the bushes within

the site each year. There were 80 tropicbird nests within the site in 1991. Eventually all nest sites will be lost.

Cleanup activity at this site has been funded by DNA as a line item in the budget and does not fall within a special act or fund. It has been deemed to be a significantly important project to warrant such treatment. It is just as well since there is no doubt that significant pressure would have built by now to force the remediation work since it is technically a hazardous waste site. The project had languished since the initial attempt at cleaning up the soil with prototype equipment in the mid to late 1980's. New life was infused into the project in 1991 and all the mothballed equipment was put back on line by a new contractor, TMA/Eberline. The operation is supervised by an Army Health Physicist who is part of the Field Command Johnston (FCJ) Command Staff.



Twenty-six acres are contaminated with plutonium. A prototype plant has been built and is in the process of sifting through an estimated 400,000 cubic yards of coral "soil" to locate and remove the plutonium.

(R. Di Rosa)

It is a very interesting operation. It is quite similar to a hi-tech gold placer operation that might detect gold going down the sluice and riffle tray by detectors that could activate gates to shuttle the gold bearing soil off to the

side for closer inspection. In this case it involves radioactive particles and their detection and segregation. It is a prototype operation that has proven successful in previous tests, and this project will determine if the equipment can actually do the job on a large scale. Apparently there are many such contaminated sites in other countries as well. The actual amount of contamination (plutonium) to be retrieved is unknown but extremely small in relation to the amount of material in which it is contained. The project will be moving perhaps as much as 400,000 cu. yds. of "coral soil" through the crushing and detection equipment to find perhaps only a golf ball-sized amount of plutonium. This of course is a very rough guesstimate since the amount of the fissionable material in a warhead is classified, and the explosions scattered the material over a wide area.

1992 saw some major activity in the site. By the end of the year most of the problems had been worked through and the remediation was moving at a steady pace. About one-fourth of the site had been cleaned of Pu by the end of the year. Of course, all the bushes in that area had been removed forcing returning nesting red-tailed tropicbirds to seek new sites or not nest. Research has found that they are most likely not to nest until the following year. About 75 pairs of birds will have to relocate by the end of the project. We coordinate closely with the project manager and remove only those bushes in the non-nesting period of the year that are likely to be a problem until the next expansion of work. This allows us to maximize nesting since the project will take a couple more years.

CLEAN WATER ACT

There exists a continuous oil leak (technically a spill) from the seawall into the lagoon in the boat basin area. It is the result of migrating diesel fuel from a large amount of subsurface petroleum contamination in that area. It is a chronic violation of the Clean Water Act that DNA has shown little interest in correcting. However, pressure has been put on DNA to respond to this or indicate their intention of doing nothing so that the FWS can pursue it accordingly. A disinterested attitude has been taken toward the chronic spill by DNA and contractor personnel. Refuge staff monitor the spill from time to time to develop a relative idea of degree of contamination. It is hard to estimate the quantity of oil leakage but it does not appear to be great since a little oil goes a long way toward producing a sheen and slick. However, it is chronic and amounts vary with the tides, but there is always a sheen that will cover thousands of square feet at times. The DNA finally responded to the leak by having the Base contractor place a boom in the water

to contain the oil. It was only minimally successful since it doesn't encompass the whole area and regular skimming of the oil doesn't occur.



The infamous tank 49 area where thousands of gallons of petroleum are below the surface and chronically seep into the lagoon. The attempts at containment by placing a boom were inadequate. (R. Di Rosa)

In addition, the Manager notified the DNA command in 1991 that containment structures around several large petroleum tanks are not in compliance with regulations. They do not contain impermeable bottoms and some of the berms have deteriorated. Furthermore, there are drains that lead directly into the lagoon. Any leaks or discharges would quickly seep into the coral-based substrate and then DNA would be responsible for a RCRA site and/or a discharge into the lagoon. Such spills have occurred in the past.



Containment structures around several large petroleum storage tanks do not have impermeable bottoms. Furthermore, some have drains that empty directly into the lagoon. (R. Di Rosa)

The EPA has never done a thorough inspection of the atoll. Personnel have never inspected for violations of the NPDES or Clean Water Acts or RCRA violations outside of JACADS.

The Punahale fuel barge developed a leak while at the pier off loading fuel. A boom was deployed to contain the fuel and the spilled fuel was soaked up from the water's surface with absorbent pads. No damage to refuge resources occurred. When it returned to Hawaii the barge was condemned by the Coast Guard.



Additional fuel spills into the lagoon occurred when the Punahale fuel barge began leaking. (R. Di Rosa)

Terrestrial Oil Spills

A terrestrial fuel oil spill occurred in the Red Hat area (chemical weapons storage compound). About 15 cubic yards of contaminated soil was removed by the Base contractor. On a hunch, the Manager followed up on its disposal because he knew there was no plan for disposal or treatment of such waste. The pile of contaminated soil was located piled on the ground in the hazardous waste storage yard. There were no plans for disposal. The Manager had the contractor remove the pile to a temporary "farming" area for natural bioremediation since the amount was fairly small. The manager of the Environmental, Safety and Health division of the contractor was eventually fired for negligence in this and other areas. By the end of the year the Base contractor had not completed a plan to deal with disposal or treatment of soils contaminated by such incidents.

CLEAN AIR ACT

For many years the chosen method of disposal of anything that would burn (and many things that would not) was to toss it into the solid waste burn pit. It continues today; however, the EPA has established that this is unacceptable and the refuse must be incinerated in accordance with federal regulations. An incinerator has been in the design process for quite some time and close to completion by year end. The DNA has been attempting to engage in reducing the waste stream and segregating components to reduce the size and, therefore, cost of the incinerator. Their attempts to this point have been inadequate and a much more serious effort is needed. Actual starting dates for building and beginning operations are unknown and DNA will remain in technical violation until the incinerator is built and becomes operational.

Unfortunately, since past burning practices were not very discriminating it has resulted in a RCRA site because of heavy metal contamination of the old ash pile. See Waste Burn Pit, RCRA.

OTHER

Bioremediation of Pentachlorophenol Treated Munitions Boxes

The Manager reviewed a project proposal from an Army contractor to bioremediate a large amount of chemically treated munitions boxes on the island. The proposal was inadequate in design and necessary information and could have led to soil and water contamination. The project was denied by the Manager and the proposal returned to the contractor for redesign and review. The project was canceled.

On a regular basis the Manager travels around the island reviewing construction, general island activities, equipment use and waste/debris storage sites for potential violations and natural resource conflicts. The following problem areas were discovered:

The contractor was improperly storing waste pipe, tile and other materials containing asbestos. The health risk appeared to be low but the situation needed correction. The contractor made plans to solve the problem but by year end had not corrected it.



Additional contaminants issues involved inappropriate storage of hazardous or potentially hazardous materials such as asbestos containing materials. (R. Di Rosa)

Uncontrolled sandblasting activities were occurring. Sand containing potentially contaminated paint particles was dumped at the burn pit area. Also, sandblasting of equipment was not occurring on a concrete pad as required if the paint being removed is toxic. Two contractors had not determined if the paint they were removing was toxic. The Manager halted the activities until the contractors analyzed the paint to determine toxicity. The paint was nontoxic and, even though the piles were unsightly, no cleanup was required.

Contractor personnel were discovered washing out large containers with poisonous cleaning fluids and flushing the wash liquid directly into the lagoon. The procedure was stopped and the responsible parties were reprimanded by the contractor management.

The military and their contractor along with the EPA should be monitoring these activities. The fact is that they are not. Therefore, the Refuge Manager acts as a watch dog to insure protection of refuge resources. The contractor's and DNA's own personnel are not as knowledgeable in some areas of contaminants as the Refuge Manager. What makes some of these issues so irritating is that many are nothing more

than the use of common sense and asking the right questions about procedures. Admittedly, it takes time to change attitudes and institute change, especially since there has been only limited enforcement until recently. Also, most of the current Base contractor (RSN) personnel and the contaminants issues predate the contractor. RSN obtained the Base operations contract from the previous contractor, Holms and Narver, in 1990 and absorbed its personnel. H and N had been here for over 40 years, so one can imagine the thought processes that had been established. A degree of understanding is required, but the Manager has refused to accept excuses where common sense and regulations dictate otherwise.

The Manager has been constantly surprised at the ignorance of both DNA personnel and contractor management in regard to personal and corporate liability involving contaminants. Consequently, he has been a constant thorn in the sides of both. However, some have admitted he has indeed been right and many changes have been made since 1990, but more changes in both attitudes and operations are needed. The light at the end of the tunnel is indeed much brighter. In addition, the hiring of a real live contaminants specialist, Chip Demarest, in the Honolulu Ecological Services office has helped to reduce the burden on the Refuge Manager.



Unexpected contaminants problems popped up through the year. In this case, it was discovery of several unknown large underground storage tanks. (R. Di Rosa)

Comment

As the Service's defacto contaminants representative at the atoll, the manager keeps constant and open communications with the Army, DOE, DNA and their contractors to prevent and/or minimize impacts to refuge resources. This is a day-to-day process which may not directly involve contaminants issues. However, the Manager's efforts enhance and facilitate the processes of dealing with these issues on a continuing basis. Not having a reasonably knowledgeable contaminants representative (defacto or otherwise) on the atoll would greatly complicate the Service's ability to deal with the complexities of this refuge and its controversial activities. The changing of the military commands every year complicates the issues. This results in a never ending process of educating the commanders and staff officers. The contractors can have a high rate of turnover as well. It is the Refuge Manager's contaminants files and knowledge that maintains the continuity.

The reader has probably noted that there appears little reference to the Biologist when discussing contaminants issues and activities. That is because the Biologist does not have experience in this area, nor does she have the time. Running the seabird and volunteer programs and engaging in environmental education are a full time, and then some, business. So, not mentioning her in no way lessens the impact she has on the Refuge programs. Maintaining these programs allows the Manager to spend the necessary time on the contaminants issues and related politics. Issues which he so dearly loves. (If you believe that then he has a bargain on some hazardous waste and political footnotes he'd like to sell.)

Epilogue

The Superfund Amendment and Reauthorization Act of 1986 made federal facilities subject to the same Comprehensive Environmental Response, Compensation, and Liability Act requirements as nonfederal facilities. As a result, Johnston Atoll was required to submit a Preliminary Assessment/Site Investigation (PA/SI) report to the EPA. The major objectives of the PA/SI are: 1) To gain an understanding of the nature and degree of the threat posed by the site; 2) to determine the likelihood of a Hazardous Ranking Score (HRS) of 28.5 or greater; and 3) to identify sites in need of immediate response. Sites with an HRS greater than 28.5 are listed on the National Priorities List (NPL). Federal facilities on the NPL are required by law to begin Remedial Investigations and Feasibility Studies within six months of listing. The PA/SI was prepared and submitted to the EPA in October of 1989. The projected HRS for

Johnston Atoll was 52.2 which would make it the highest scoring federal facility in the Pacific. The three major contaminants are dioxin, plutonium, and subsurface diesel fuel, all of which have been released into the marine environment. Only the dioxin has been demonstrated to be entering the food chain.

If the NPL rating is so high why hasn't Johnston been listed? We are not quite sure, and it most probably has something to do with politics. However, there is beginning to be a push by the responsible parties to begin remediation work. The hope or feeling is that if sufficient progress can be demonstrated then the site may remain off the list, thereby, allowing DNA and the Air Force more control over the cleanup activities without direct EPA oversight and involvement.

5. Research and Investigations

Two major research projects which were designed to assess potential impacts of the JACADS project on the wildlife resources of the Refuge were continued. Two additional research projects were initiated on two of the seabird species nesting at the atoll. Marine research projects related to JACADS and contaminants continued as well.

JHN-1-92 Seabird Monitoring Studies

The seabird monitoring studies of Seabird Research Inc. were supported by funds from the Army and administered by CEPOD. Their primary goal is to assess and monitor the size and "health" of marine bird populations throughout the operation of the JACADS project. Ten major questions were posed to achieve these goals: Total and breeding population size of each species, numbers of nests receiving eggs, number of young raised to fledging, egg size and weight, growth rates of young, types of nest sites, diet, rates and causes of mortality, and susceptibility to human disturbance.

Researchers continued their long term studies under the direction of Elizabeth Anne Schreiber from March 22 - April 16 and from June 29 - July 13.



Betty Ann Schreiber prepares to weigh a Red-tailed tropicbird chick as part of her numerous research activities. (R. Di Rosa)



Betty Ann attached homemade transmitting devices to several tropicbirds in order to measure times spent at sea and at the nest. (R. Di Rosa)



Betty Ann's research assistant and husband, Gary Shank, captures banded Sooty terns in order to gather life history data. (R. Di Rosa)

JHN-2-92 Marine Resource Studies

Dr. Phillip Lobel, Woods Hole Oceanographic Institution (WHOI), continued his marine research with funding from PMCD (Army). This included studies of marine fish reproduction, collection of certain benthic feeding fishes to be analyzed for dioxins and furans, and monitoring of selected lagoon resources. Dr. Lobel and two graduate assistants visited the atoll from May 8 - 25 and from August 7 - 10. Plans were drafted and work began to convert the decommissioned Coast Guard Signal Building on the causeway of Sand Island into a marine research station under the direction of Dr. Lobel and WHOI. The Army will provide the major operating

and rehabilitation funds. Additional funding is expected to come from the DNA and the Air Force for contaminants monitoring and research. The lab is expected to continue operating through the life of JACADS.



Dr. Phil Lobel, Woods Hole Oceanographic Institution, returned to Johnston Atoll to continue his Army funded, JACADS related research. (R. Di Rosa)

JHN-3-92 Flight Proficiency of Pelagic Tropical Seabirds at JA

This research was being conducted by UCLA Ph.D. candidate Lisa Ballance as partial fulfillment for requirements of a Ph.D. degree. The research had four objectives pertaining to four species of seabirds at JA, Sooty Terns, Masked and Red-footed Boobies and Wedge-tailed Shearwaters. The objectives were: 1) To measure field metabolic rates; 2) To measure resting metabolic rates; 3) To quantify the proportion of time an adult spends sitting on the nest and at sea and the proportion of time an adult spends in flight and resting on the water while at sea; 4) To obtain measurements of wing morphology and body mass to calculate wing loading and aspect ratio. Ms. Ballance worked with the following hypothesis: The flight proficiency of a seabird reflects the biological productivity of the waters over which it forages such that species foraging in areas of low productivity will be more efficient fliers than species foraging in areas of high productivity. The work required the use of tritiated

water and all necessary clearances from the NRC and the military command were obtained. The field portions of the study were completed this year and we are waiting on the final results and dissertation.



Ph.D. candidate Lisa Ballance and various assistants spent most of the summer camped on East and Sand Islands, conducting research on seabird energetics. (R. Di Rosa)



Assisted by her parents (research assistants), Lisa draws blood from a Red-footed booby in order to measure the remaining tritium in its system from a previous injection. (R. Di Rosa)



Lisa attached homemade timing devices that ceased recording when the booby was in the water. They resumed recording when the booby took flight. (R. Di Rosa)



Major Bob Matthew, conducts a surface survey for plutonium particles in Wedge-tailed shearwater nesting areas on Sand Island. (R. Di Rosa)



After the plutonium check, a little environmental education was in order. Lisa instructs Bob in the finer points of shearwater research. (R. Di Rosa)

JHN-4-92 Red-tailed Tropicbird, JACADS Impact Monitoring

Refuge staff continued the upwind/downwind monitoring study of the red-tailed tropicbird populations located upwind and downwind of JACADS. This is a special study begun last year to gather population data from these two locales to determine if there are any significant trend differences. It also provides baseline population data should there be a chemical accident resulting in a major chemical agent release.

JHN-5-92 Bulwer's Petrel Breeding Biology

Biologist O'Daniel began a breeding biology study of the Bulwer's Petrel along the causeway of Sand Island where the species nests in natural rock crevices. Nests were located and monitored and individual birds were banded and marked in order to measure incubation interval lengths of adults. Chicks were monitored for fledging success and overall reproductive success of the species was determined. Vocalization counts were conducted at different times during the night throughout the breeding season to see if they could be used to estimate the number of breeding pairs. It is anticipated that the study will continue in 1993. Very little is known about this species, and Biologist O'Daniel expects to be able to gather much important and previously unknown information about its life history. The research is being conducted on her personal time.



Refuge Biologist O'Daniel began a breeding biology research project on the diminutive Bulwer's petrel.
(R. Di Rosa)



Dedicated volunteers like Bill Freeman and Ed Dean were critical to the success of Donna's Bulwer's petrel research project. Checking petrel nests was just one of their duties. (R. Di Rosa)

E. ADMINISTRATION

1. Personnel



Refuge Manager Roger Di Rosa (J. Bowman)



Refuge Biologist Donna O'Daniel
(R. Di Rosa)

The Refuge had a full time staff of two, a permanent refuge manager and a temporary wildlife biologist.

Roger Di Rosa, EOD 5/5/90.Refuge Manager, GS-11, PFT

Donna O'Daniel, EOD 5/10/91.Biologist, GS-7, TFT

Johnston Atoll NWR is rather unique in that funding is received from the Army and the Service with some on-island support from DNA. The Refuge staff function as members of the Base Commander's Staff, yet have numerous responsibilities to other funding agencies. This leaves them with several groups demanding time and attention to their projects. Even though the Base Commander is listed on the command staff personnel flow charts as the Refuge Manager's direct supervisor, the Manager's chain of command remains DOI. The Manager is regarded as an advisor to the

Base and Army Commanders unless push comes to shove on an issue(s), then he can become an adversary. The Refuge Manager for the Pacific/Remote Islands Complex is the Manager's supervisor. It is well known that FWS personnel retain a high degree of autonomy, responsibility and authority on the Atoll, and the Refuge Manager can and does on occasion supersede the Base and Army Commanders' authorities regarding environmental and public use issues.

Such responsibility and authority come with a high social and personal price at times. The FWS personnel are very well known on the atoll. The Refuge Manager is considered a community leader and usually is obligated to not only attend, but participate in, numerous functions for high ranking military and civilian dignitaries and VIPs. Also, he regularly briefs such personnel on environmental issues, FWS operations and FWS/military relationships. Meals are community affairs taken in a cafeteria, thus offer little respite from those seeking our company or wanting to discuss business or complain about something FWS related. Business related calls are common after normal work hours. The Manager shares a reasonably nice row-type apartment with another command staff member, usually a Major. The biologist, being lower grade, shares a somewhat less comfortable apartment with another female. As you might suspect, the Refuge staff live in a fish bowl with their personal as well as their professional activities under constant scrutiny. The ratio of males to females on the atoll is about 5 to 1 so that creates its own social agenda. It is a very highly socially and politically charged and close environment for the staff and a considerably different environment from other refuges. There is only limited escape from public contact and work issues. It is essential that the Manager and Biologist practice tact and diplomacy with regard to their personal and professional lives because the two are not regarded by people as separate. The ability to communicate well and wisely use diplomacy and tact is an absolute necessity for staff at JA NWR. Gross mistakes are not readily forgotten and do not remain "in house", that is, they immediately go beyond the Refuge to be viewed by three other government agencies and several major contractors. If ever the term non-traditional fit a refuge and the duties of its staff, Johnston Atoll NWR is certainly it.

The major responsibilities of the staff are: Monitoring wildlife populations and habitat (terrestrial and marine); advising and supporting the JA Base Commander, tenant commands and contractors on environmental and Refuge concerns; providing interpretation/ education and volunteer programs for JA residents and visitors; liaison and coordination with visiting researchers and oversight of the projects; acting as a watchdog regarding contaminants

issues, reviewing related documents and ensuring the appropriate responses as necessary; and planning, budgeting, and managing the Refuge resources. The duties of the Manager and Biologist overlap, mostly in the biological programs. However, the Manager handles all contaminants issues and related problems. The Biologist has responsibility for the extensive seabird programs as well as other biological duties, administration of the volunteer program and representing the Manager during his absences. The Manager also is involved with the island or interagency "politics", and handles VIP and press briefings and interviews; budgeting, and oversees the marine resources and Refuge SCUBA diving programs. Both individuals engage in environmental education activities and conduct refuge tours for VIPs.

Other

The Manager was detailed to Guam for a month to begin the "nuts and bolts" operation of determining what was needed to put the new overlay refuge on line and how much support could be obtained from cooperatives. The refuge is to be established through a cooperative agreement among four parties, FWS, Air Force, Navy and the Government of Guam and will be mostly an overlay of military lands.

4. Volunteer Program

Numerous military and civilian personnel assist the Biologist and Manager with biological surveys and seabird banding duties. All of these individuals expressed a strong interest in natural history and biology of the species found on the Refuge. Many of the volunteers are used for one or two surveys and the trips provide both aid to the Refuge staff and an opportunity to allow the volunteers to photograph wildlife and receive an interpretive tour. Several proved to be excellent assistants, showing a strong interest and helping on a regular basis. The time that our volunteers donate to the Refuge is especially appreciated since the standard work schedule for island residents is a minimum of 6 days a week, 8-12 hrs a day. Therefore, personal time is limited. The Refuge Biologist administers the volunteer program.

During 1992, 52 atoll residents donated 677 hours of their valuable time to the Refuge in resource support activities. The level of much of our biological monitoring could not be maintained without the aid of the volunteers.



Prior to the destruction of the Coast Guard LORAN tower, volunteers helped refuge staff remove eggs and chicks from seabird nests. (R. Di Rosa)



Volunteers prepared to assist with the bi-weekly island-wide shorebird census. (D. O'Daniel)

5. Funding

As indicated earlier, Johnston Atoll NWR is unique in that funding is obtained from three sources, the Army, the FWS and DNA. To be more specific, the funds come from two divisions of the Army, the Program Manager Chemical Demilitarization (PMCD) and U.S. Army Chemical Activity Pacific (USACAP). PMCD is, you might say, the owner and overseer of JACADS and USACAP deals with the storage, transport and security of the chemical munitions. The FWS funds come from the Division of Environmental Contaminants and DNA provides some on island support which is more in the form of direct services than actual funds.

Funding support is negotiated for each FY with the individual entities. The Honolulu office deals with the FWS Division of Environmental Contaminants to secure those funds based on contaminants issues and reports from the JA Manager. The JA Refuge Manager deals with the two ARMY divisions and DNA, which can be quite a challenge since each operates differently and independently of the other. The funds are spent at the discretion of the JA Refuge Manager.

The following was the funding picture for FY 1992:

Total funds from the above sources allocated to JA operations for FY 1992 was \$143,000. Last year's budget of \$125,000 resulted in a shortfall of \$20,000 that was made up by the Honolulu office. The staff is on a higher pay scale at Johnston Atoll than their counterparts stateside due to nonforeign differential and a special salary scale authorized by Congress for government civilians stationed at JA. The Manager's goal for the last year has been to secure enough funding from the military to cover operations except for the biologist's salary which comes from FWS, Division of Contaminants.

The \$101,000 secured from the two divisions of the Army for 1992 succeeded in doing that. Also, FWS-Contaminants increased its funding to \$42,000 from \$30,000 which covered the biologist's salary. There was no shortfall of funds that needed to be covered by the Honolulu office.

The following was the FY-1992 budget summary:

\$ 50,000Army-USACAP
51,000Army-PMCD
<u>42,000</u>FWS-Contaminants
\$143,000Total expended

DNA's actual contribution is unknown since billing to the FWS island account by the civilian contractor goes directly

to DNA. The Manager is not concerned about this part of the budget since none comes out of the above money and all work or charged supplies are covered. The island support contractor, RSN, performs the service on the refuge vehicles (two golf carts) and the boats and motors. It also provides heavy or other equipment if necessary for habitat management.

Do not let the nice neat figures fool you. The Manager spends a good bit of time negotiating for and obtaining the funds. However, 1992 was a breeze compared to the hassles of previous years. One problem still exists that needs to be remedied. There is no established document, MOU or otherwise, insuring funding or pathways and, consequently, the money has even been lost at times. This year, a portion of the money from the Army's USACAP division was not even received, despite cajoling from the Manager, until September. Apparently, the funding for the FWS presence on the Atoll because of JACADS was established by verbal arrangement with a past Army commander. The document that is used as the legal supporting document for the transfer of funds by the Army is an archaic 1976 MOU between the DNA and the FWS that establishes the FWS's responsibility for the natural resources and DNA's responsibility for the people and infrastructure. Bear in mind there was no FWS presence at the time of the MOU, JACADS hadn't even been conceived and the island population was but several hundred. It was mostly a mothballed operation to maintain its SAFEGUARD C status (ability to return to nuclear atmospheric testing capabilities) and for storage of some chemical munitions. The funding pathways and how they work or don't work are somewhat convoluted and difficult for someone without close connections to understand. Furthermore, they are not well defined. Needless to say, some more work is still needed in this area.

The Army accepted the Manager's FY 1993 proposal for an even larger budget (\$112,000) that would cover FWS expenses and proposed EE projects. One of the projects was to be the production of a Johnston Atoll NWR wildlife photo calendar with EE text. The biologist position was again the responsibility of FWS-Contaminants which very grudgingly provided the funds.

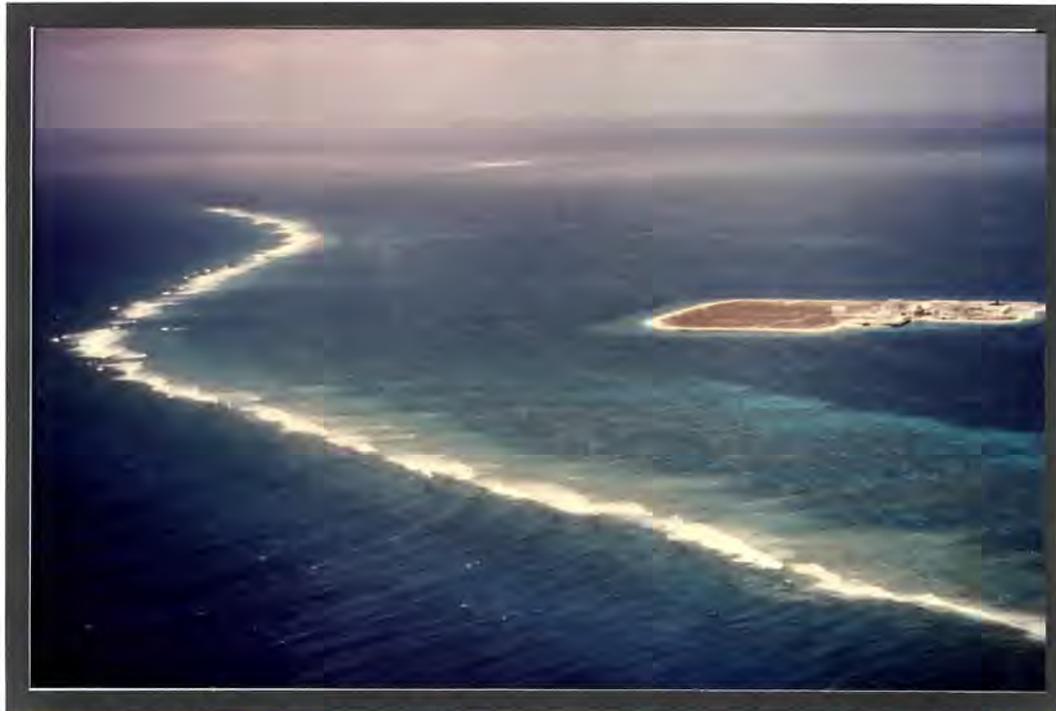
F. HABITAT MANAGEMENT

1. General

Johnston Atoll provides roosting and breeding grounds for tropical Pacific seabirds and wintering grounds for migratory shorebirds. The coral reef ecosystem is unique in

that both Hawaiian and central Pacific organisms are represented. Johnston Atoll is the only land mass available as a roosting and breeding habitat for seabirds in 820,000 square miles of ocean. The importance of Johnston Atoll in the ecology of the central Pacific is far greater than its relatively small land mass would suggest. Within this area, the waters most intensively foraged by birds from Johnston Atoll are probably those to the west where food availability is increased by upwellings and eddies created by the down-current "wake" of the atoll.

The value of the Atoll has expanded from the initial emphasis on seabirds to also recognize the value and potential uniqueness of its marine resources. Atolls in general are not well studied but JA is one of the most studied in the world, which isn't saying a whole lot. Even though 302 species of fishes are documented from the atoll it has not undergone a truly thorough survey. Invertebrates is a wide open area for study and given the Atoll's age and isolation, there could be many undescribed species present.



The fringing reef on the east, west and north of the atoll protects the shallow lagoon habitat and islands (North Island in photo) from the ravages of large ocean waves. (D. Forsell)

6. Other Habitats

Acropora and Montipora species dominate the coral community, with Acropora cytherea being especially dominant in coverage. This species, commonly called "table coral", can attain 100% coverage in many areas and is probably one of the fastest growing coral species. It also provides an extensive three-dimensional habitat for many fishes. The fish community is dominated by relatively few species of the 302 documented species which is a result of the Atoll's isolation, size and surrounding sea currents. This also limits the diversity of the coral community which further limits the number and species of fish that might occur at the Atoll. The documented number of species of coral at JA is 33 but only a few make up the major portion of the reef habitat.



A typical reef scene as seen by a SCUBA diver. Several species of Acropora coral form most of the lagoon habitat. (R. Di Rosa)

Terrestrial habitats, especially shrubs, are a major concern on Johnston Island. The population of Red-tailed Tropicbirds increased this year to approximately 1550 pairs. Seventy-five pairs nested under the bushes in the Plutonium Area in 1992. All bushes in this area were removed in the fall after the tropicbirds had finished nesting so the soil could be remediated. This will have a great impact on the displaced pairs of tropicbirds in 1993 because they use the

same bushes year after year. Removal of these bushes may heighten competition for nesting space on Johnston Island.

The Coast Guard LORAN station on Sand Island was decommissioned in July. The 640 foot tower on the east side of the island was blown down on December 3 by a demolition team of a special engineering unit of the Army from Hawaii. The December time frame was our best guess as the best time to do the operation for minimal impact to seabirds. The end of the year is the low part of the cycle for nesting seabirds at JA, except for sooty terns which can be very unpredictable. To help direct any nesting sooty terns away from Sand Island during that time the Coast Guard paid to have grass removed from areas of East Island in 1991. The strategy worked well and the terns delayed their nesting assault on Sand Island until late December. It was a close call. At the time of the demolition, there were 24 pairs of Great Frigatebirds and 3 pairs of Brown Boobies nesting within the circle of guy wires holding up the tower. All the nests contained eggs except for three which contained frigatebird chicks. The eggs and chicks were temporarily removed from their nests and subsequently replaced after the tower and guy wires were brought down. No nests were deserted as a result of the operation. The only casualty was one adult male Brown Booby, which was apparently struck by a falling guy wire and killed.



An Army demolition conducted the demolition and removal of the 640 foot Coast Guard LORAN tower. (R. Di Rosa)



The charges were sequenced and everyone held their breath as the charges were detonated. The plan was for the tower to collapse and lay-out to the east. (R. Di Rosa)



This was as far as the tower got after the initial explosions. Not the slight bow. Several turnbuckles did not snap and charges had to be reset. (R. Di Rosa)



The second attempt did the trick and
the tower began its collapse.
(R. Di Rosa)



The tower continued its collapse but note the top section falling to the west. (R. Di Rosa)



Obviously, it wasn't a complete success. the top section fell across the building at the tower's base. The building will have to be demolished.
(R. Di Rosa)



The tower fell just short of the water which was a great relief since cutting it up and removing it from the water would have been a considerable chore.
(R. Di Rosa)



The Army began the job of cutting up and removing the tower and trying to clean-up as much of the lead contaminated paint chips as possible. (R. Di Rosa)



Cleaning up the paint chips in the area turned out to be a major task. Chips were extremely numerous and buried as much as seven inches deep. (R. Di Rosa)



Refuge staff and RSN workmen tried to clean up as much of the contamination as possible before the nesting terns moved in. They didn't make it and the job will be postponed for about a year until after the nesting season. (R. Di Rosa)

Artificial Reef

The Refuge Manager is tasked with assessing the biological recruitment and physical configuration of an artificial reef created from vehicles, heavy equipment, assorted steel debris and tanks and large appliances. The Army Corps of Engineers has issued a permit, renewable every three years, to DNA that specifies the type of debris and parameters to be followed regarding dumping on the reef. All vehicles and equipment placed on the reef are drained of all fluids and burned to remove plastics and residual oils and grease. No tires, plastics, etc. are permitted and only ferrous metals and large concrete debris are dumped. The site was designated in 1985 after discussions with the Service and National Marine Fisheries biologists. The reef lies in 80 ft. of water on a scoured, ancient, hard coral bottom three miles south of Johnston Island and near the edge of the atoll drop-off.

No reef building attempts were conducted this year. However, Refuge staff and Dr. Phil Lobel (WHOI) conducted an evaluation of the reef site to determine organism recruitment and vertical buildup. Two dives were performed, one on May 21 and one on May 16. Depth was 80 ft., ocean calm, current about 1 knot and visibility 80+ ft. so conditions were as good as they get in that open ocean environment. It was obvious that no vertical buildup of any sort has been achieved, which was expected from observations of the surface dumping. Debris was scattered about the bottom over a large area. Some of the debris (heavy equipment) from last years reef building attempt was located, but it appeared that smaller stuff may have been swept away by the current. On the second dive an attempt was made to locate additional debris from earlier deposits. The divers were only able to locate a small amount, even when using an underwater viewing box from the boat. Despite the scattering of the debris over a broad area it was very obvious that even small amounts were very attractive to fish populations. Any hole or relief of any kind is welcomed by the fish on that otherwise scoured bottom. The observers were very surprised at the quantity and number of species of fish around even single pieces of debris. The evaluations were documented by video and still photography.

It was obvious that if DNA wants to truly meet the intent and spirit of the Corps permit it will have to change its dumping methods to better attempt obtaining vertical buildup. The dives confirmed what we suspected, that is, that debris has been scattered over a very wide area and much of it fell outside the artificial reef boundaries as established by the permit. The Manager reiterated his recommendations for solving the problem at the biannual JA

Environmental Meeting. The DNA has not acted on the recommendations.



The area where the artificial reef is being created is located in 80 feet of water three miles south of Johnston Island. The area is a scoured flat bottom that usually has a one to two knot current. (R. Di Rosa)



The DNA has not been very diligent in adhering to the reef building permit requirements. Most debris lies scattered about the bottom. (R. Di Rosa)



However, fish will quickly aggregate around the smallest piece of debris. Those areas with more extensive debris accumulation have quite a large number of fish and species. (R. Di Rosa)



Manager Di Rosa and Dr. Lobel conducted species and recruitment surveys of fish and sessile organisms and evaluated overall reef creation attempts. (R. Di Rosa)

Sea Turtle Feeding Habitat

Up to the end of 1990 approximately 220,000 gallons of raw sewage was discharged off the south coast of Johnston Island daily. A sewage treatment plant was constructed and began operation in 1990 and pretty much eliminated the discharge of raw sewage except during malfunctions and rainstorms. The sewage sludge was treated, dried and retained to be disposed of in an as yet undefined and acceptable manner on island. The full impacts to the sea turtles and other marine organisms from the years of sewage discharge are unknown. However, it considerably altered the coral reef community in the area. The coral was killed and the high nutrient levels contributed to massive algae growth that covered the coral over much of the south coast area.

The area has become a very attractive feeding area for both adult and juvenile green sea turtles that feed exclusively on the algae. The population is estimated at 200 sea turtles based on trend data derived from monthly head counts in select areas as the feeding turtles surface to breathe. The mean number of turtles counted on a monthly basis increased from 31 in 1991 to 43 in 1992. Clearly, the reduction of nutrients into the ocean due to the sewage treatment plant has not adversely affected the turtles through their forage. We strongly speculate that it will have no affect.

10. Pest Control

The Manager stopped the \$9.5 million new BX complex and maintenance buildings construction project because the contractor was preparing to saturate the ground with a restricted pesticide, Dursban, for ground termites. That generated a considerable amount of excitement. The contractor was following the contract and had purchased and shipped the pesticide to the island. Due to past meetings and agreements, military engineering was suppose to ensure that all such activities have the written authorization of the Refuge Manager. This had not been done and the Manager happened to hear about the pesticide through the grapevine. The interesting part is that we have no problem with ground termites and the structures are concrete and steel only. It was simply contract boiler-plate instructions. The pesticide was shipped off the island and the work continued.

The Manager also learned about an engineering project to replace all the underground cables for the aircraft runway lighting system. Since insects were partly responsible for cable deterioration, plans were to saturate the trenches with pesticide before laying the cables. He made it perfectly clear he would not consider pesticides unless all

available alternatives were considered and cost was not to be a sole determining factor for exclusion of an alternative. The simple alternative of placing the cable inside PVC pipe was accepted.

G. WILDLIFE

2. Endangered and/or Threatened Species

Hawaiian Monk Seal

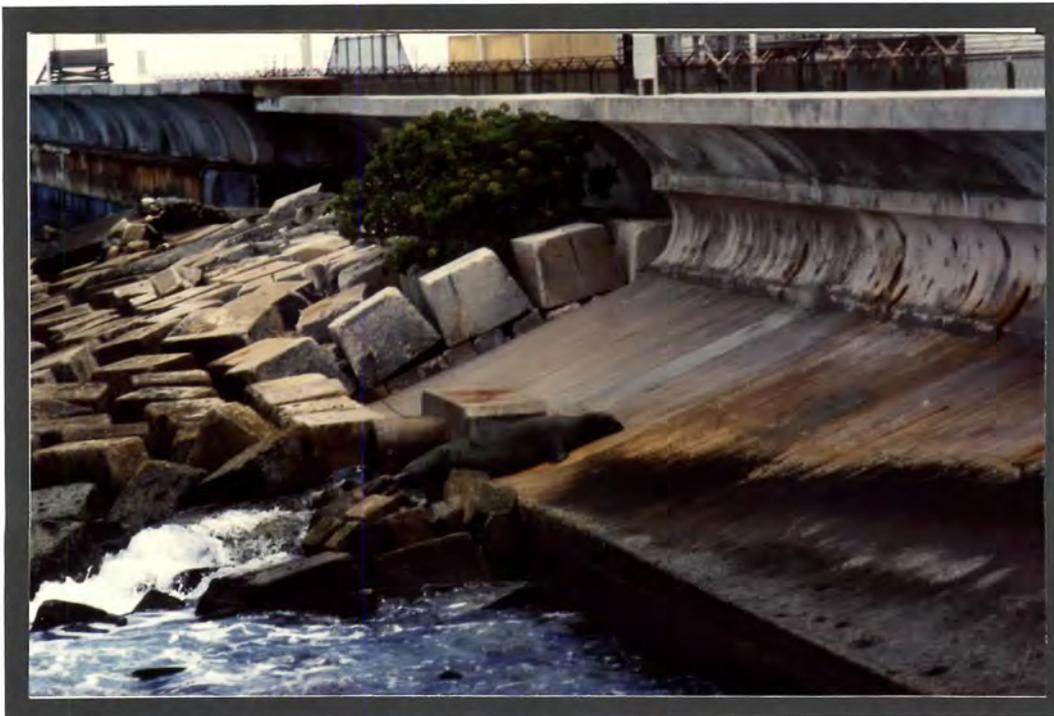
Endangered Hawaiian monk seals (Monachus schauinslandi) have historically, at least since 1968, used Johnston Atoll intermittently in very low numbers, some how finding JA from the Northwest Hawaiian Islands. Federal laws and island regulations concerning the protection of both Hawaiian monk seals and green sea turtles are stressed to all visitors, as well as to permanent personnel. In 1984, nine monk seals were translocated to Johnston Atoll from Laysan Island in the Northwest Hawaiian Islands; since that time, an occasional sighting of a single animal (very probably unrelated to the introduced nine) has been reported.

What was thought to be the same large adult Hawaiian monk seal was first sighted at the end of December 1991 and has been seen throughout 1992 (29 sightings reported to FWS). It was originally seen on the north side of Johnston Island, just east of the Point House, eating snake eels in shallow water. Most of the other sightings were off the south side of JI, by or near the JACADS cooling water outfall on the east side of the plant. There was one reliable and additional unconfirmed sightings of 2 seals in 1992. We don't know why the seals have been seen so consistently the last year and a half. We speculate that it is related to the documented population pressures occurring in their colonies in the outer Hawaiian Islands.

How the seals find JA is another matter. It is unlikely they know JA is here and most probably find us by accident. This makes one wonder about the probability involved in a single seal finding such an isolated place, or there may be a lot more seals than suspected roaming the central pacific.



At least two and maybe more Hawaiian monk seals appeared at the atoll. One seal spent much of its time in the shadow of JACADS. Look closely in the center of the photo. (R. Di Rosa)



Throughout the year, the seal's favorite hauling-out spot was below JACADS by the 008 non-contact cooling water outfall. (R. Di Rosa)

Green Sea Turtle

The Refuge supports a population of the threatened green sea turtle (Chelonia mydas). The turtles do not nest at Johnston Atoll, although mating has been observed off the south shore of Johnston Island. They feed extensively on the algae beds off the south side of Johnston Island. What makes this especially interesting is that this feeding area and high concentration of turtles lies next to JACADS. This threatened species lives, quite literally, in the shadow of chemical demilitarization.

Turtle monitoring was conducted in 1992, 11 counts being made from a four-meter high tower off the southeastern end of the JACADS peninsula. All turtles sighted from the tower during three 15 minute observation periods in three different locations were counted. Sightings along with size and time of observation are recorded on a map. At the end of the count, the observer attempts to discern how many individuals are present as each active turtle usually surfaces for a breath of air about every five minutes. The mean number counted in 1990 (38) is significantly higher than it was in 1988 (25) or 1989 (23), and in 1992 almost twice what it was in 1988. The increase in mean numbers may be due entirely or in part to observers' abilities. The main observer (Refuge Manager) changed in May 1990.

The low count of 13 recorded in June 1992 seemed to be an anomaly, as the next lowest count was 29 (which only occurred once), and between 50-60 turtles were counted on 8 of the 11 censuses conducted during the year. It appears that the resident sea turtle population may have increased since the counts were initiated in 1988.

In August 1992, scientists of the National Marine Fisheries Service Honolulu Laboratory attached a small, satellite-linked transmitter to the shell of a female green sea turtle nesting at French Frigate Shoals in the NW Hawaiian Islands. This female turtle was tagged at Johnston Atoll in 1983. Over a 4-week period the turtle was tracked and it was found to swim directly to Johnston Atoll from the NWHI over open ocean, generally against prevailing winds and currents. (See map.)

Satellite-linked transmitters were placed on three nesting female sea turtles at French Frigate Shoals, Hawaii. One turtle returned to its feeding grounds at Johnston Atoll, a distance of 480 nautical miles.

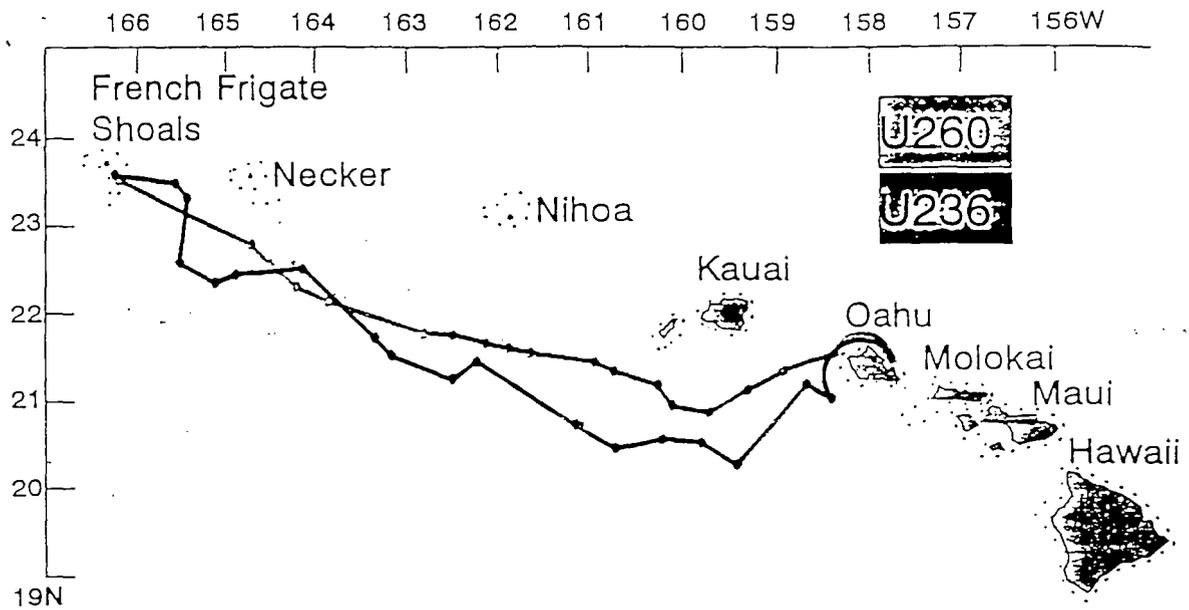


Figure 1. Migratory pathways taken by healthy turtle U260 and tumored turtle U236.

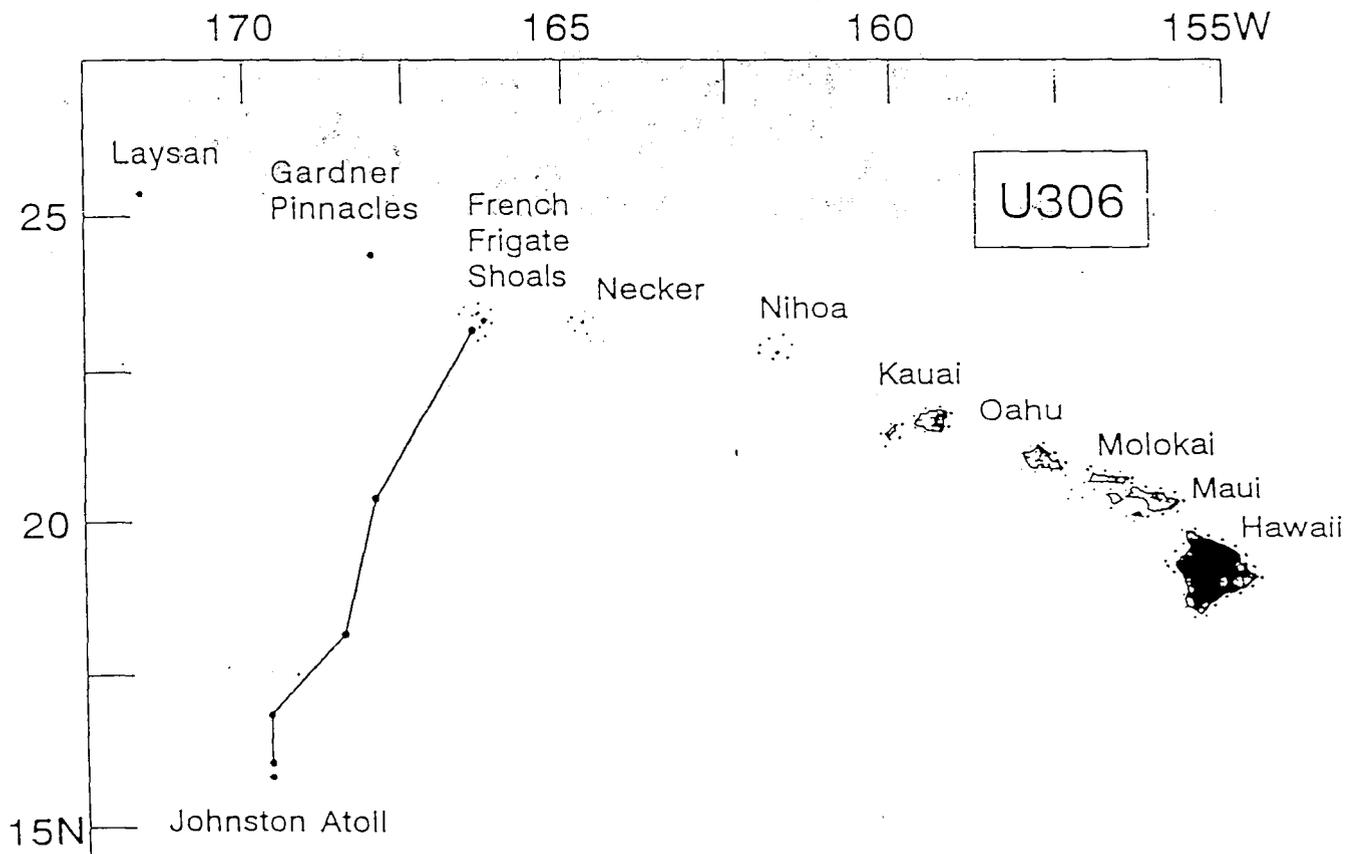


Figure 2. Migratory pathway taken by healthy turtle U306.

Humpback Whale

There is no evidence in the historical record of whales and dolphins occurring around Johnston Atoll, but there have been documented sightings of the humpback whale (Megaptera novaeangliae) in recent years. Six humpbacks were seen in February 1992 just outside the lagoon, one of which was small and may have been a calf. Two, a mother and calf, were sighted by a National Marine Fisheries researcher in early April just outside the reef north of the lagoon. Because of the great distance between Johnston Atoll and the next nearest land mass, these sightings have led us to speculate that Johnston Atoll may be a calving ground for this endangered species.

5. Shorebirds, Gulls, Terns, and Allied Species

During 1992, there was a major shift in the population of Great Frigatebirds from Sand and East islands to North Island. Twenty-two pairs nested in the bushes on the northeast side of the island from October 1991 through August 1992. Only one pair of frigatebirds had nested on North Island before that. The atoll-wide Great Frigatebird count in November revealed that 80% of the 1325 birds on the atoll were roosting on North Island.

By mid-September, 12 pairs of Red-footed Boobies had nested on top of some of the low bushes on the south side of the old firing range on the north side of North Island. This is the first known nesting of this species on that island.

On December 18, a storm with high winds and driving rain occurred which destroyed many trees on Johnston Island used by Black Noddies and White Terns to nest. Approximately 30 chicks of each species and an unknown number of eggs were lost. Nest building by the Black Noddies and egg laying by both species were well underway by mid-January 1993.

All four islands of Johnston Atoll are used as roosting and/or breeding grounds for at least some of the 14 species of seabirds using the Refuge (Table 1).

The biweekly shorebird counts were continued during 1992. The highest count for Golden Plovers occurred on 19 April and for Ruddy turnstones on 06 September (Table 2.). Reports from island residents indicated that the majority of shorebirds departed JA for their northern breeding grounds on May 2. The birds began returning from their breeding grounds in late August.

TABLE 1. Populations of nesting seabirds estimated on Johnston Atoll during 1992. Estimates do not include non-breeding and roosting individuals which may be as large as 50 to 100 percent of the breeding populations, and much greater in frigatebirds, red-footed and masked boobies, and white terns.

SEABIRD SPECIES	BREEDING PAIRS
Bulwer's Petrel	60
Christmas Shearwater	20-30
Wedge-tailed Shearwater	2100
Red-tailed Tropicbird	1550
White-tailed Tropicbird	1
Masked Booby	10
Red-footed Booby	260
Brown Booby	340
Great Frigatebird	85
Sooty Tern	151,000
Gray-backed Tern	180
Brown Noddy	5,500 (2,400) ¹
Black Noddy	172 (483) ²
Blue-gray Noddy	0
White Tern	137 (297) ²

1. Number in () reflect breeding pairs on North Island encountered through mean incubation counts.

2. Numbers for these species reflect the highest combined count of eggs and chicks during a single census. The actual breeding population is somewhat higher. Numbers in () are the total number of eggs found for each species during 1992.

TABLE 2. Wintering shorebird estimates for Johnston Island during 1992.

SHOREBIRD SPECIES	INDIVIDUAL BIRDS ¹
Pacific Golden Plover	324
Ruddy Turnstone	189
Bristle-thighed Curlew	20
Sanderling	14
Wandering Tattler	7

1. Reflect highest number recorded for each species during the winter bi-weekly census periods.



The Red-tailed tropicbird is our most important seabird species at JA since 99% of them nest on Johnston Island amid the human activities. Each nesting season, the sky is filled with Red-tails engaged in courtship displays. (R. Di Rosa)



We had a surprise visitor and nester at the atoll in the form of a Clipperton booby from Clipperton Island off Baja, Mexico. It mated with a Brown booby and produced a chick. (R. Di Rosa)



The large numbers of Sooty terns nesting on the outer islands would cause occasional problems with work activities, especially at Sand Island. (R. Di Rosa)



Coast Guard personnel would devise a variety of actions to protect themselves during the onslaught of nesting birds. Black plastic would keep terns off the roadway to the transmitter building. (R. Di Rosa)

9. Marine Mammals

See G.2, Endangered and/or Threatened Species (above) for coverage of the humpback whale and Hawaiian monk seal.

There were several sightings of what appeared to be a small whale within the lagoon during April, July, and August of 1992. These were thought to be Cuvier's beaked whales (*Ziphius cavirostris*) since positive identification of this species has been made in recent years at Johnston Atoll. A Cuvier's beaked whale was seen and positively identified by National Marine Fisheries researcher Lisa Ballance in September 1992 approximately 2 miles north of North Island, outside the reef. Based on good past data we speculate that JA may be a calving and/or feeding area for this rare and little known species.

Spinner and bottlenose dolphin pods also have been sighted outside the lagoon on several occasions.

11. Fisheries Resources

Each spring, beginning about mid-March and continuing for about two months, grey sharks aggregate in the sandy shallows on the south side of the eastern portion of Sand Island. This phenomenon has been occurring at JA for as long as anyone can remember. The sharks would be easy prey for any line or spear fisherman who would have to do nothing more than stand on the shore to kill them. We feel that the only reason the sharks are still doing this at Sand Island is because the Coast Guard LORAN tower is on the site, and access by the public is prohibited. This phenomenon is not unique to JA and similar grey shark behavior is known in other remote south pacific islands and protected areas in the Hawaiian Islands.

The refuge staff has constantly heard that the aggregation represents mating and/or pupping activities. The Manager has heard the same from knowledgeable ichthyologists. However, a search of the literature did not turn up much information. Apparently it is a well known phenomenon, but it has been little studied, most probably due to the fact it now mostly occurs only on remote atolls. People have extirpated the sharks in most areas near habitation.

The Refuge Manager, having a long standing interest in sharks, took a personal interest in the activities. He spent many hours of his own time observing the sharks from shore and in the water and doing census counts approximately every other day. From his observations he determined there was no mating activity taking place and it probably would be safe to enter the water with the sharks during their aggregation. Some very interesting information emerged from the above and below water observations. To the best of our knowledge this is the best information available. You read it here first.

The sharks began arriving each day around noon regardless of the state of the tide and remained until early evening. They began arriving in a trickle in mid-March and gradually increased to maximum number in early April. The number slowly decreased to only several animals by mid-May. The maximum number observed was 160 which lasted about one week. All sharks were female grey reef sharks of about 4 1/2 feet in length (some bigger, some smaller). No males were ever observed and the females bore no mating wounds so no breeding activity was taking place at any time. No pupping activity was observed and no sharks appeared pregnant. The sharks were not affected by or curious about the Manager's and Biologist's presence underwater. They were just something to go around. However, they were responsive to auditory, olfactory and visual stimuli. continue next year.



A small portion of the 160 (peak number) grey reef sharks that aggregated in the shallows every afternoon on the south side of Sand Island for two months.
(R. Di Rosa)



All the grey reef sharks were females. No mating (no males were observed) or pupping took place.
(R. Di Rosa)

15. Animal Control

During 1992, two Black Noddies and one Pacific Golden Plover were struck by aircraft. Two were struck when the aircraft was landing and one when the aircraft was taking off.

During 1991, seven birds were struck by aircraft.

Considering the number of birds that fly around the runway this is a remarkably small number. No control measures were deemed necessary except on vegetation adjacent to the runway.

16. Marking and Banding

TABLE 2. Summary of banding accomplishments for 1992.

<u>Species</u>	<u>Seabird Research, Inc.</u>	<u>Fish & Wildlife</u>
Bulwer's Petrel	0	132
Red-tailed Tropicbird	864	826
White-tailed Tropicbird	0	2
Masked Booby	13	2
Brown Booby	195	176
Red-footed Booby	162	145
Sooty Tern	600	0
Gray-backed Tern	0	165
White Tern	1	0

A total of 1,835 birds were banded by Seabird Research Inc. and 1,448 were banded by Fish and Wildlife Service staff..

H. PUBLIC USE

1. General

The population of Johnston Atoll averaged about 1300 military and civilian contractor personnel in 1992. There is no "public" access as such. The Base is a restricted installation and all personnel must be employed at the Atoll or officially visiting and possess an entry authorization from the Base Commander to debark from any ship or plane. Because of the high visibility of JACADS and the chemical operations, the Atoll receives at least monthly visits by general grade officers, Senior Executive Service personnel of the Department of Defense and/or Energy and members of

Congress or their staffs. Refuge staff usually have at least some involvement with most of these individuals. Most will receive at least a Refuge tour of the outer islands conducted by the Manager or Biologist. The Manager may provide the individuals with extended briefings on resource and/or contaminants issues and the FWS's role and responsibilities at the Atoll depending on their involvement in these issues.

The following is a list of some of our more noteworthy visitors that the Manager briefed and he and/or the biologist attended functions for and took on tours of the Refuge.

Mr. Steven Thompson, Staff Member, House Armed Services Committee

Col. Cordis Colburn, Deputy Chief, Legislative Liaison, U.S. Army

Col. John O'Shea, Army Environmental Officer

General Busbee, U.S. Army Chemical Demilitarization Command, Washington D.C.

Ivo Spalatin, Staff Director, House Committee on Foreign Affairs Subcommittee on Arms Control

Walker Roberts, Minority Staff Consultant, House Committee on Foreign Affairs

David Barton, Staff Consultant, International Security and Science, House Committee on Foreign Affairs

Col. Arley McCormick, incoming commander for the Lexington-Bluegrass Army Depot (proposed site of a controversial JACADS type facility)

Charles Baronian, SES-4, National Resource Council and presidential advisor on chemical demilitarization

Col. William Dassler, Field Command DNA, Albuquerque, NM

Don Schueler, SES-4, Manager Technical Support and Bruce Church, Asst. Manager Environmental Safety and Health, both from Department of Energy, Nevada National Field Office

Dr. Robert Brownlee, Safe Guard C Advisor to DOE and the President of the U.S.

Bob Nelson, SES-6, Deputy Manager and Dr. Thomas Kunkle, Senior Scientist, DOE, Los Alamos National Laboratory

General Miller, Commander of Field Command DNA, Albuquerque

General Hagemann and Rear Admiral Wisely, both from DNA, Washington D.C.

Col. Nolan Adams, Assistant Deputy for Chemical Demilitarization, Office of the Asst. Secretary of the Army, the Pentagon

Thomas Baca, Deputy Assistant to Secretary of Defense of Environment, Safety and Occupational Health

In addition to the above, there were numerous individuals of lesser importance but still considered VIPs by the military, and highly respected EPA personnel, some of which the Manager personally addressed. Also, the Manager and Biologist attend the yearly but separate change of command ceremonies for the Army and DNA Commanders at JA. The Manager usually presents an award and short speech at the "end of tour" departure dinners and ceremonies.

7. Other Interpretive Programs

All newly arrived personnel on the Refuge, whether they are visitors or permanently assigned, are presented a 15-minute briefing at the airport terminal by military personnel. Within that "dos and don'ts" briefing is several minutes of short discussion about Johnston Atoll NWR regulations. They also receive a copy of the Refuge brochure. A second briefing for all "newcomers" stationed for more than one month on the Atoll is part of the three-hour introductory program given each Friday. The Biologist or Manager presents a 30-minute slide program about the Refuge, its history and wildlife, reasons for its existence and relationship with the military, and pertinent regulations and reasons for their existence. In addition, each individual receives a copy of the Base Regulations, which incorporate FWS regulations, regarding the natural resources of the Atoll. The Refuge brochure is basically the only document that visitors have to send to friends and relatives that describes the Atoll. It is franked and visitors may have as many copies as they wish.

The Biologist spends a good deal of time administering the volunteer program which has become a great success. We cannot accommodate the number of people who wish to help us with our work. The volunteer program provides us an excellent opportunity to do interpretative work on an intimate basis. It also allows the volunteers a chance to

photograph birds in restricted areas under a controlled setting.

The Refuge has outdoor and indoor display areas. The outdoor display is composed of one large sign that is permanently displayed and describes the Refuge and diversity of nesting habitats of the seabirds. The second sign has a display we rotate monthly that features a different species or group of animals each month.

The indoor display is composed of two glass-covered bulletin board type displays in the headquarters building. We change the displays as necessary to feature the latest volunteer activities and selected natural resource topic.

In addition to the above, the Manager and Biologist engage in organized presentations to island residents such as slide programs and lagoon and seabird colony tours as time permits. All researchers visiting the Atoll are encouraged to make presentations to the Atoll residents about their particular area(s) of expertise or research.



Refuge staff conducted a variety of EE activities for island personnel during the year. Biologist O'Daniel and Manager Di Rosa staffed a FWS information "booth" during the July 4th festivities. (R. Di Rosa)

Most high ranking military and civilian dignitaries and their entourages are given a lagoon tour of the outer islands and seabird colonies by the Manager or Biologist. This can take up a lot of time due to the number of dignitaries that come through at times. Usually the time is well spent since we also get to discuss the FWS mission and FWS/military relationship on a more intimate basis. Also, since the Army is funding most of the FWS operation we very rarely refuse their requests.

In 1990 the Refuge Manager spoke at two international press conferences related to Johnston Atoll/JACADS and environmental issues. A reporter and freelance writer from Australia covering the event took special notice of the seeming incongruity of such a military operation on a national wildlife refuge. In 1991 he asked the Manager to help him with a story he wanted to write for Geo Magazine. Geo Magazine is a National Geographic-like magazine of the Pacific region, especially the South Pacific. The reporter could not return to JA since the military would not give him clearance. The Refuge Manager is the only one on the atoll who can talk directly with the press or high level politicians without supervisory involvement or censorship. The article was published this year.

9. Fishing

Recreational fishing is a popular activity on Johnston Atoll. The University of Hawaii research team estimated almost 7,000 hours of effort were expended in fishing activities in 1989. In previous years, estimates were double that. After termination of the U of H study no estimates have been made. Catches are made from shore and boat using pole and line, throw net, and spear (Hawaiian sling only) while diving. Also, fishing parties organized by the Base Recreational Services Office use the Base's landing crafts ("MIKE" boats) to troll outside the Refuge boundary in deep water for pelagic species such as wahoo, dolphin and tunas.

The atoll's human population has increased considerably as has the fishing pressure on the resource since the University of Hawaii study. The Refuge Fishing Plan is a bit outdated and needs revision. Data are lacking in all areas to aid in making decisions and regulations.

The Manager and Biologist have been gathering historical and current information on shark fishing at the atoll. Almost all is anecdotal and comes from both atoll old-timers and long time marine researchers that have been coming and going for up to a decade. Despite it being anecdotal there is very strong evidence to support the conclusion that there

has been a sharp reduction in shark observations from boaters, fishermen and divers. In the past, fishing for and killing reef sharks was a major pastime, especially with military personnel. It is well known and documented how easily small island shark populations can be greatly affected by excessive fishing.

Lacking any other data in regard to sharks and shark fishing the refuge staff decided to err on the side of conservatism. With all this in mind, and with the support of the Base Commander, the Refuge Manager instituted a ban on all shark fishing. Any sharks caught while fishing for other species were to be released without boating them or dragging them onto land. As could be expected there was some opposition to the regulation but the overwhelming reaction was one of support. The fact that we had initiated an informational campaign about the importance of sharks and the serious impact to populations worldwide from uncontrolled slaughter and waste did not hurt the cause. For those that are wondering, there is no record of a shark attack at JA on a diver or swimmer.

16. Other Non-wildlife Oriented Recreation

The lagoon is used for a variety of non-wildlife related recreation swimming, sailing, kayaking, water skiing, windsurfing and limited camping on the outer islands. We assume that virtually all snorkeling and SCUBA diving activities are wildlife related.



A variety of non-wildlife oriented recreational activities are supported by the military at Johnston. Sailing and a variety of motor boat activities are common pastimes. (D. Forsell)



SCUBA diving is also a very popular activity at Johnston, the impacts of which are not well documented. (R. Di Rosa)

17. Law Enforcement

See above (section 9. Fishing) for discussion of shark fishing regulations.

The Manager and Biologist have no law enforcement authority on the Refuge because all enforcement authority is vested in the Base Commander and administered by the Base security force. The Base Commander is obligated to enforce all FWS and other federal laws and regulations pertaining to natural resources. The Commander can create a regulation instantly if deemed necessary by him and the Refuge Manager. As a result of the severe punishments involved (possible loss of job and deportation from the island) and the interpretive program, violations of wildlife regulations are rare.

Since Johnston Atoll NWR is also a highly secure military installation we approach punishment for violations of FWS regulations in a different manner from other refuges. On minor violations the Refuge Manager and Commander discuss the violation and agree on a penalty, and the Commander administers it. On more severe violations such as violations of the Endangered Species Act or Migratory Bird Treaty Act, the Manager reserves the authority to have prosecution handled through the FWS. Military personnel are in additional jeopardy from military regulations.

Two RSN employees violated the Migratory Bird Treaty Act by throwing stones at a nesting white tern which resulted in the destruction of the egg. The Manager allowed RSN Base Security to investigate the incident and allowed RSN management to handle it internally. Both guilty individuals were removed from the island by the company and returned to their homes in Hawaii for two weeks without pay. It was a significant punishment that caught everyone's attention.

Not all incidents went quite as smoothly. One of the problems the refuge staff has to deal with each year is the change of Base commanders. One may be very supportive of the regulations and quick to act while another may only grudgingly act or actually be in opposition. Only one such incident worth noting occurred in 1992.

The departing Base Commander signed regulations opening previously off-limits sections of the lagoon to recreational activities which included spear fishing and live shell collecting. He did this days before he was to depart the atoll and while the Refuge Manager was off the island and without his knowledge. This particular commander had been in constant opposition to refuge regulations preventing or controlling recreational activities in areas of the lagoon and on the seabird colonies. There also had been strong

feeling about the Manager's authority to control such activities. Upon his return, the Manager stopped the new activity and had the new regulations rescinded. This was done over the strong objections of the Lt. Col. who also had been "less than supportive" of the FWS mission. The incident was brought to the attention of the incoming commander who agreed, at least in principle, with the Refuge Manager and the situation was returned to normal.

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

The refuge vehicles are two golf carts owned by the Service and maintained by the Base contractor.

5. Communications Systems

Refuge operations are basically supported by the Base infrastructure and radio net. One hand-held unit is assigned to us and others are at our disposal as necessary. We operate on the Base channels.

7. Other

When the Coast Guard LORAN station closed its doors the Biologist and Manager descended on the excess and unneeded equipment. A new typewriter, file and other cabinets and miscellaneous supplies and equipment were obtained for the refuge.

The primary FWS facility is the refuge office located in the Joint Operations Center (Base headquarters). The office is adjacent to the offices of the Base Engineer and the Base Commander. It is provided and furnished by DNA so that the Refuge staff is able to work closely with the Base command. All ADP equipment is owned by the FWS. The Joint Operations Center is a four story air-conditioned, over-pressurized building that is secure against hurricane and, of course, gaseous agents.

The FWS maintenance or project needs are basically supported on island by the contractor and costs are billed to a special O&M on island account that is not part of the regular budget negotiated by the Manager every year. It is time consuming to have things accomplished. A written request must be submitted to DNA Engineering who reviews it then passes it to the contractor where it goes through a couple of channels before arriving at the proper office. Everything must be spelled out to insure the project is accomplished properly. If it needs to be done quickly then

the Refuge Manager can pull the necessary strings through the Base Commander. The refuge staff also can charge to the above account any items available in the supply warehouse that are needed for projects. The drawback is that one to several of many items cannot be obtained. Whole boxes or large rolls must be purchased. However, the carpenters, painters and machinists are good to us and will give us many smaller items or quantities to meet our needs.

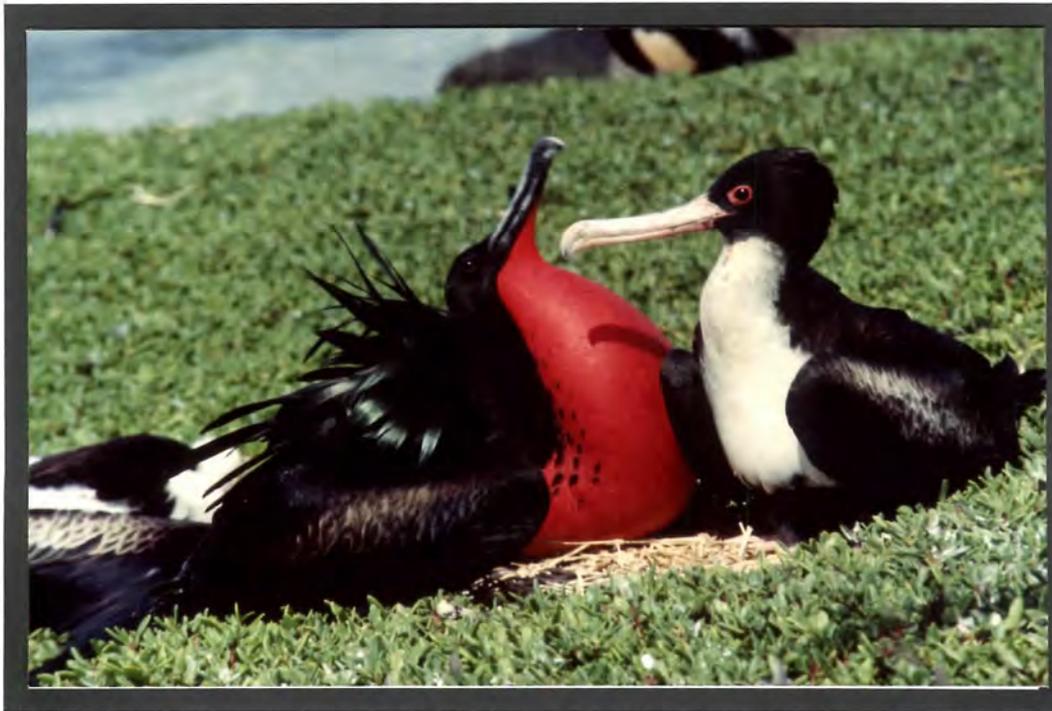
J. OTHER ITEMS

3. Credits

Sections B, D 5, E 4, F 1 and 6, G 5, 9 and 16 were written by Biologist O'Daniel and the rest was written by Manager Di Rosa. Some historical material was copied from previous narratives written by D. Forsell.



A group of male Great frigatebirds engaging in courtship displays trying to attract females. (R. Di Rosa)



And for some males, all the effort was worth it when a female decides to share the nest. (R. Di Rosa)